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2020

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

**TENDER REF: BHEL/NR/SCT/GHAVP/GEO-
TECH/1220**

**NAME OF WORK: GEOTECHNICAL INVESTIGATION
FOR 2x700 MWe PHWR GORAKHPUR HARYANA
ANU VIDYUT PARIYOJNA- UNITS NO. 1&2 AT
GORAKHPUR, FATEHABAD, HARYANA.**

Bharat Heavy Electricals Limited



NOTICE INVITING E-TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

To

Dear Sir/Madam

Sub : NOTICE INVITING E-TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION
i	TENDER NUMBER	BHEL/NR/SCT/GHAVP/GEO-TECH/1220
ii	Broad Scope of job	GEOTECHNICAL INVESTIGATION FOR 2x700 MWe PHWR GORAKHPUR HARYANA ANU VIDYUT PARIYOJNA- UNITS NO.1&2 AT GORAKHPUR, FATEHABAD, HARYANA.
iii	DETAILS OF TENDER DOCUMENT	
a	Volume-IA	<i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i> Applicable
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i> Applicable
c	Volume-IC	<i>General Conditions of Contract (GCC)</i> Applicable
d	Volume-ID	<i>Forms and Procedures</i>
e	Volume-II	<i>Price Schedule (Absolute value).</i> Applicable
iv	Issue of Tender Documents	Tender documents will be available for downloading from BHEL eProcurement portal (https://eprocurebhel.co.in) till due date of submission: Start : 01/04/2021, Time : 17:30 hrs Closes: 12/04/2021, Time : 10:00 hrs Brief information of the tenders shall also be available at BHEL website (www.bhel.com) Applicable/ Not applicable
v	DUE DATE & TIME OF OFFER SUBMISSION	Date : 12/04/2021, Time : 10:00 hrs Place : on https://eprocurebhel.co.in Applicable
vi	OPENING OF TENDER	Date : 12/04/2021, Time : 15:30 hrs Notes: Applicable

		(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.	
vii	EMD AMOUNT	Rs 28,820/-	Applicable
viii	COST OF TENDER	Free	
ix	LAST DATE FOR SEEKING CLARIFICATION	Five days before bid submission due date Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: G.V. RAJA SEKHAR Designation: Sr. Manager Deptt: SCT Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301 Phone: (Landline) 0120-2416232 Email : gvr@bhel.in 2) Name: DESHRAJ YADAV Designation: Sr. Engineer Deptt: SCT Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301 Phone: (Landline) 0120-2416261 Email : deshraj@bhel.in	Applicable
x	SCHEDULE OF Pre Bid Discussion (PBD)		Not applicable.
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)		Not Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc. to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums), BHEL eProcurement portal (https://eprocurebhel.co.in) and not in the newspapers. Bidders to keep themselves updated with all such information.	

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

3.0 **Not Used.**

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

For Electronic Fund Transfer the details are as below:-

a) **Name of the Beneficiary** -: Bharat Heavy Electricals Limitedb) **Bank Particulars**

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

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

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

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

a. **Technical Tender (UN priced Tender)**

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

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

b. **Price Bid:**

- i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
- ii. The price should be quoted for the accounting unit indicated in the e-tender document.
- iii. Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- iv. A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may,

- without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- v. A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

DO NOT'S

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

Digital Signing of e-Tender

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

The Requirement:

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

The contact details of the service provider are given below:

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

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

International bidders are requested to prefix 91 as country code

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

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

The process of utilizing e-procurement necessitates usage of **DSC (Digital Signature Certificate)**

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

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

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

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

6.0 Not used.

- 7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.
- 8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

9.0 **Assessment of Capacity of Bidders:**

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

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

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

Total number of Packages in hand = Load (P)

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

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

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

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

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

- $P_1, P_2, P_3, P_4, P_5, \dots, P_N$ etc. be the packages (under execution/ executed during the 'Period of Assessment' in all Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = P_T (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$)
- Number of Months ' T_1 ' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1 . Similarly T_2 for package P_2 , T_3 for package P_3 , etc. for the tendered scope. Now calculate cumulative total months ' T_T ' for total similar Packages ' P_T ' for all Regions (i.e. $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$)
- Sum ' S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5}, \dots, S_{1-T_1}$) for similar package P_1 , for the 'period of assessment' ' T_1 ' (i.e. $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-T_1}$). Similarly, S_2 for package P_2 for period T_2 , S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum ' S_T ' of 'Monthly Performance Evaluation' Scores for total similar Packages ' P_T ' for all Regions (i.e. ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots + S_N$ ')

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

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

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

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

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

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No. of similar packages for all Regions = P _T i.e. Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T ₁	T ₂	T ₃	T ₄	T ₅	...	T _N	Sum (Σ) of columns (iii) to (ix) = T _T
3	Monthly performance scores for the corresponding period (as in Row 2)	S ₁₋₁ , S ₁₋₂ , S ₁₋₃ , S ₁₋₄ , ... S _{1-T1}	S ₂₋₁ , S ₂₋₂ , S ₂₋₃ , S ₂₋₄ , ... S _{2-T2}	S ₃₋₁ , S ₃₋₂ , S ₃₋₃ , S ₃₋₄ , ... S _{3-T3}	S ₄₋₁ , S ₄₋₂ , S ₄₋₃ , S ₄₋₄ , ... S _{4-T4}	S ₅₋₁ , S ₅₋₂ , S ₅₋₃ , S ₅₋₄ , ... S _{5-T5}		S _{N-1} , S _{N-2} , S _{N-3} , S _{N-4} , ... S _{N-TN}	-----
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S ₁	S ₂	S ₃	S ₄	S ₅	...	S _N	Sum (Σ) of columns (iii) to (ix) = S _T

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

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

'Assessment of Capacity of Bidder' is based on the Maximum number of packages for which a vendor is eligible, considering the performance scores of similar packages, as below:

Max number of packages $P_{Max} = (R_{BHEL} - 60)$ divided by corresponding value of 'L', i.e. $(R_{BHEL} - 60)/L$

Note:

- In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number
- For $R_{BHEL} = 60$, $P_{Max} = '1'$
- For $R_{BHEL} \geq 80$, there will be no upper limit on P_{Max}

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$

(Where P is calculated as per clause 'I' above)

IV. Explanatory note:

- Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or C&I etc. at the individual level irrespective of rating of Plant and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, C&I, Civil, Structure etc. is considered individual level of package. For example, in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e. the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl.no. II above, needs to be evaluated considering all the identified packages (i.e. Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above.

ii). Identified Packages (Unit wise)

Table-1

Civil	Electrical and C&I	Mechanical
i). Enabling works ii). Pile and Pile Caps iii). Civil Works including foundations iv). Structural Steel Fabrication & Erection v). Chimney vi). Cooling Tower vii). Others (Civil)	i). Electrical ii). C&I iii). Others (Elect. and C&I)	i). Boiler & Aux (All types including CW Piping if applicable) ii). Power Cycle Piping/Critical Piping iii). ESP iv). LP Piping v). Steam Turbine Generator set & Aux vi). Gas Turbine Generator set & Aux vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine)

		ix). Material Management x). FGD xi). ACC xii). Others (Mechanical)

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

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

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

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

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

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

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

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

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

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

c. Up to Synchronization in all Balance Packages

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

- vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.
 - vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 25th of Evaluation Month or 3 days after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.
 - viii). Project on Hold due to reasons not attributable to bidder -
 - a. **Short hold:** Evaluation shall not be applicable for this period, however Loading will be considered.
 - b. **Long hold:** Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.
 - ix). Performance evaluation as specified above in this clause is applicable to Prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work.
- 10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail and/or through e-procurement portal, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.
- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Not Applicable.

- 16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 19.0 BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com on "**supplier registration page**") for this tender. RA shall be conducted among the techno-commercially qualified bidders. Price Bids of all the techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 Consortium Bidding (or Technical Tie up) : NOT APPLICABLE.
- 24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self-certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.
- 25.0 The bidder may have to produce original document for verification if so decided by BHEL.
- 26.0 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.
- 27.0 Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page**".
- 28.0 The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.
- 28.1 Integrity commitment, performance of the contract and punitive action thereof:
- 28.1.1 **Commitment by BHEL:**
BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

28.1.2 Commitment by Bidder/ Supplier/ Contractor:

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

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

29.0 Not Applicable.

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

31.0 PREFERENCE TO MAKE IN INDIA:

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

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

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this Clause means:-
 - a. An entity incorporated established or registered in such a country; or
 - b. A subsidiary of an entity incorporated established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose *beneficial owner* is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or

- g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- IV. The *beneficial owner* for the purpose of (III) above will be as under:
1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
Explanation
 - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
- VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Note:

- (i) The bidder shall provide undertaking for their compliance to this Clause, in the format provided in Annexure-9.
- (ii) Registration of the bidder with Competent Authority should be valid at the time of submission of bids and at the time of acceptance of the bids.

32.0 Not used

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

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

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

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

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

35.0 Not used**36.0 Order of Precedence:**

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

- a. Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL

- b. Notice Inviting Tender (NIT)
- c. Price Bid
- d. Technical Conditions of Contract (TCC)—Volume-1A
- e. Special Conditions of Contract (SCC) —Volume-1B
- f. General Conditions of Contract (GCC) —Volume-1C
- g. Forms and Procedures —Volume-1D

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

for BHARAT HEAVY ELECTRICALS LTD
(SCT)

Enclosure:

- (i) Annexure-1: Pre Qualifying Requirements.
- (ii) Annexure-2: Check List.
- (iii) Annexure-3: Reverse Auction Process Compliance Form
- (iv) Annexure-4: Authorization of representative who will participate in the online Reverse Auction Process
- (v) Annexure-5: RA Price Confirmation and Breakup
- (vi) Annexure-6: Undertaking as per C4 of Annexure-1 i.e. PQR
- (vii) Annexure-7: Declaration reg. Related Firms & their areas of Activities
- (viii) Annexure-8: Declaration reg. minimum local content in line with revised public procurement
- (ix) Annexure-9: Declaration by the Contractor
- (x) Other Tender documents as per this NIT.

ANNEXURE - 1**PRE QUALIFYING REQUIREMENTS (PQR)**

JOB	GEOTECHNICAL INVESTIGATION FOR 2x700 MWe PHWR GORAKHPUR HARYANA ANU VIDYUT PARIYOJNA- UNITS NO.1&2 AT GORAKHPUR, FATEHABAD, HARYANA.
TENDER NO.	BHEL/NR/SCT/GHAVP/GEO-TECH/1220

SL NO	PRE QUALIFICATION CRITERIA	APPLICABILITY
A	Submission of Integrity Pact	NOT APPLICABLE
B	Assessment of Capacity of Bidder to execute the work as per sl. no. 9 of NIT	APPLICABLE
C1	<u>Bidder who wish to participate should have experience as follows::</u>	APPLICABLE
C-1.1)	Bidder should have executed Similar work for any one of the following in the last seven years from latest date of bid submission: One (1) work of value not less than Rs. 11.53 Lakhs. OR Two (2) works each of value not less than Rs. 7.20 Lakhs. OR Three (3) works each of value not less than Rs. 5.76 Lakhs.	
D-1	<u>Financial TURNOVER</u> Bidders must have achieved an average annual financial turnover (Audited) of Rs 4.32 Lakhs or more over last three Financial Years (FY) i.e 2017-18, 2018-19 and 2019-20. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated above along with all annexures. 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. In case audited Financial statements have not been submitted for all the three years as indicated above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three.	APPLICABLE
D-2	NETWORTH (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'D-1' above should be positive. NETWORTH Shall be calculated based on the latest Audited Accounts as furnished for D-1 above. Net worth = Paid up share capital + Reserves.	APPLICABLE
D-3	PROFIT: Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'D-1' above.	APPLICABLE

	Note: PROFIT shall be PBT earned during any one year of last three financial years as in 'D-1' above.	
D-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking (Annexure-6) to this effect.	APPLICABLE
E	Approval of Customer	APPLICABLE (BY BHEL)
F	Consortium Criteria	NOT APPLICABLE
<u>Explanatory Notes for the PQR (unless otherwise specified in the PQR):</u> - For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria C1 above, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following: - The parent company shall have a controlling stake of $\geq 50\%$ in the subsidiary company (as per Format-1). - The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit(SD) equivalent to 1% of the total contract value. - The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2). - Completion date for achievement of the technical criteria specified in the Technical' criteria of PQR (as in 'C' above) should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work. - For Sl. No 'C-1' above the word 'Similar Works' means "Geotechnical Investigation Work" for any kind of project (Residential / Commercial / Industrial). 'EXECUTED' means the bidder should have achieved the criteria specified in the Technical criteria of PQR (as in 'C' above) even if the Contract has not been completed or closed. <u>Explanatory Notes for QR 'C1'</u> - For QR 'C1' above, actual executed value shall be considered. - The evaluation currency for this tender shall be INR. - For QR 'C1' above, Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula- $P = \left\{ R + 0.425 \times R \times \frac{(X_N - X_0)}{X_0} + 0.425 \times R \times \frac{(Y_N - Y_0)}{Y_0} \right\}$ Where P = Updated value of work R = Value of executed work X_N= All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).		

	X_0 = All India Avg. Consumer Price index for industrial workers for last month of work execution. Y_N = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered). Y_0 = Monthly Whole Sale Price Index for All Commodities for last month of work execution. • Relevant documents, meeting above requirements at C & D, shall be submitted by bidders.

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

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

Format-1**Certificate for relationship between Parent Company / Subsidiary Company and the bidder**

To,

.....

.....

Dear Sir,

Sub: Bid for NIT No dated..... for “.....” (name of the tender).

We hereby certify that M/s..... is Parent Company/ Subsidiary Company of M/s(the bidder) and details of equity holding of the Parent Company in Subsidiary Company as on(not earlier than seven days prior to the Bid Submission Date) are given as below:

Name of Parent Company	Name of Subsidiary Company	Percentage of Equity Holding of Parent Company in Subsidiary Company

(Insert Name and Signature of Statutory Auditor or practicing Company Secretary of the Bidder)

Undertaking from the Parent Company/ Subsidiary Company of the bidder
(On the Letter Head of Parent Company/ Subsidiary Company, as applicable)

From,
Name:
Full Address:

Telephone No.:
E-mail address:
Fax/No.:

To,
.....
.....

Dear Sir,

We refer to the NIT No dated..... for “.....” (name of the Tender).

“We have carefully read and examined in detail the NIT/Tender Terms and Conditions, including in particular, Clause of the NIT/Tender, regarding submission of an Undertaking, as per the prescribed Format 1 of the NIT/ Tender.

We confirm that M/s..... (the Bidder) has been authorized by us to use our Technical capability for meeting the Technical Criteria as specified in Clause.....of the PQR of the NIT/Tender referred above.

We agree to submit the Security Deposit equivalent to 1% of the total contract value in addition to Security Deposit to be submitted by Bidder as per Clause.....of the NIT/Tender for fulfilment of all obligations in terms of provisions of the contract, in the event of(the Bidder) being selected as the Successful Bidder.

We confirm that we along with M/s.....(the bidder), are jointly or severally responsible for successful performance of the contract.

We confirm that our company shall not participate in the above tender as a ‘Standalone Bidder’ or as a ‘Consortium bidder’ and also shall not authorize any other bidder to use our Technical capability for the above tender.

All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the referred NIT/Tender.

Signature of Managing Director/Authorized signatory of Parent/ Subsidiary Company

ANNEXURE - 2**CHECK LIST****NOTE:- Tenderers are required to fill in the following details and no column should be left blank**

1	Name of the Tenderer		
2	Address of the Tenderer		
3	Type of the Firm/ Company		
(i)	In case of Individual Tenderer	His / her full name, address and place & nature of business shall be furnished along with the offer.	
(ii)	In case of Partnership Firm	The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership duly certified by the Notary Public shall be furnished along with the offer.	
(iii)	In case of Companies	a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished). b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.	
4.a	Details of Contact person for this Tender	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4.b	Details of alternate Contact person for this Tender	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
5	EMD DETAILS	Mode of payment: Demand Draft/ NEFT/ RTGS/ OTHER Details of Transaction:	
6	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
	DESCRIPTION	APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
7	Whether all pages of the Tender documents including annexures, appendices etc are read and understood	Applicable	YES / NO
8	Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE – 1) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
9	Audited Balance Sheet and profit & Loss Account for the last three years	Applicable	YES / NO
10	Copy of PAN Card	Applicable	YES / NO
11	Copy of GST registration	Applicable	YES / NO

SL. NO.	DESCRIPTION	APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
12	Organization Chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.	Applicable	YES / NO
13	Integrity Pact [Annexure-3]	Not Applicable	YES / NO
14	Offer forwarding letter / tender submission letter [Form No. F-01 (Rev 00)]	Applicable	YES / NO
15	Declaration by Authorised Signatory [Form No: F-02 (Rev 00)]	Applicable	YES / NO
16	Declaration by Authorised Signatory regarding Authenticity of submitted documents [Form No: F-02A (Rev 00)]	Applicable	YES / NO
17	No Deviation Certificate [Form No: F-03 (Rev 00)]	Applicable	YES / NO
18	Declaration confirming knowledge about Site Conditions [Form No: F-04 (Rev 00)]	Applicable	YES / NO
19	Declaration for relation in BHEL [Form No: F-05 (Rev 00)]	Applicable	YES / NO
20	Non-Disclosure Certificate [Form No: F-06 (Rev 00)]	Applicable	YES / NO
21	Bank Account Details for E-Payment [Form No: F-07 (Rev 00)]	Applicable	YES / NO
22	Format for seeking clarification [Form No: F-08 (Rev 00)]	Applicable	YES / NO
23	Capacity Evaluation of Bidder for current Tender [Form No: F-09 (Rev 00)]	Applicable (by BHEL)	YES / NO
24	Power of Attorney for Submission of Tender/Signing Contract Agreement [Form No: F-25 (Rev 00)]	Applicable	YES / NO
25	Analysis of Unit rates [Form No: F-26 (Rev 00)]	Applicable	YES / NO

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

DATE :

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

ANNEXURE - 3**Reverse Auction Process Compliance Form**

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

To

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

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

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

This letter is to confirm that:

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

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

With regards

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:

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

ANNEXURE – 4**Authorization of representative who will participate in the on line Reverse Auction Process:**

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

ANNEXURE – 5

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

To

- M/s. Service provider
- Postal address

CC: M/s BHEL

{Unit-
Address-}

Sub: **Final price quoted during Reverse Auction and price breakup**

Dear Sir,

We confirm that we have quoted.

Rs.{____ in value & in words _____} for item(s) covered under tender enquiry No. {...} dt.{...}

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

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

The price break-up is as given below.

Total

=====

- Rs. in value & in words

=====

Yours sincerely,

For _____

Name:**Company:****Date:****Seal:**

ANNEXURE – 6

UNDERTAKING

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

To,

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

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: **BHEL/NR/SCT/GHAVP/GEO-TECH/1220**

I/We, _____

declare that, I/We am/are not under insolvency resolution process or liquidation 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.

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

Place:

Date:

ANNEXURE-7**DECLARATION**

Date: _____

To: _____
Address: BHEL, _____

_____Email: _____
_____Sub: **Details of related firms and their area of activities**

Dear Sir/ Madam,

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

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

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

Regards,

(_____)

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

Annexure-8

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

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

To,

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No: **BHEL/NR/SCT/GHAVP/GEO-TECH/1220**,
2) All other pertinent issues till date

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

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

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

Thanking you,
Yours faithfully,

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

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

Note:

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

ANNEXURE-9

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017
(To be typed and submitted in the Letter Head of the Entity/ Firm providing certificate as applicable)

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No: **BHEL/NR/SCT/GHAVP/GEO-TECH/1220**,
2) All other pertinent issues till date

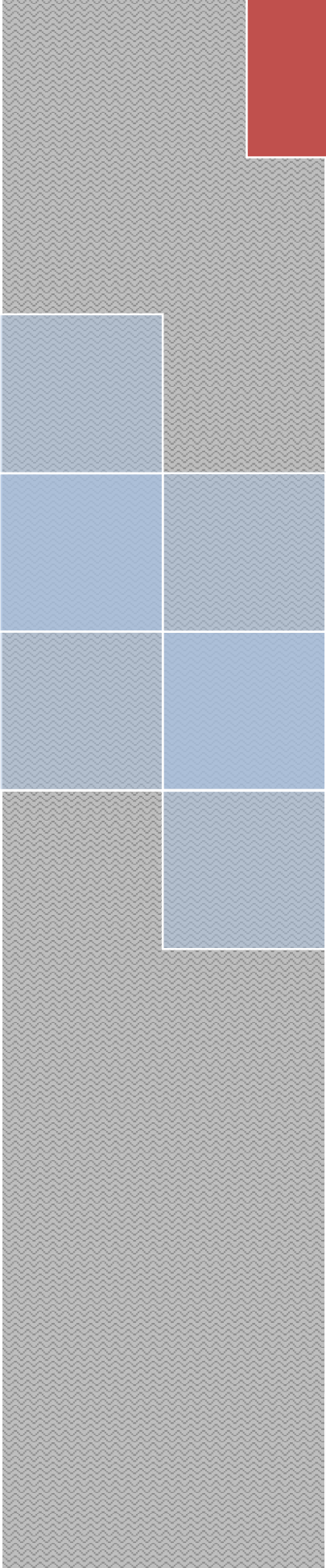
I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ **(SPECIFY THE NAME OF THE ORGANIZATION HERE)**, is not from such a country/ has been registered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

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

Thanking you,
Yours faithfully,

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

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



VOLUME- IA: TECHNICAL CONDITIONS OF CONTRACT (TCC)

NAME OF WORK: GEOTECHNICAL
INVESTIGATION FOR 2x700 MWe PHWR-
GORAKHPUR HARYANA ANU VIDYUT
PARIYOJNA- UNITS NO.1&2

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC) CONTENTS

Sl No	DESCRIPTION	Chapter	Page No.
Volume-IA	Part-I: Contract specific details		
1	Project Information	Chapter -I	3-4
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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I: Project Information

2X700MWe PHWR- GORAKHPUR HARYANA ANU VIDYUT PARIYOJNA UNIT# 1&2

NPCIL has awarded the work for Design & Engineering, manufacture, Procurement, Erection/ Construction, commissioning & testing, trial operation and handing over of Turbine Island for 2 nos of 700MWe PHWR (Pressurised heavy water reactor) based nuclear power plants to be set up at Gorakhpur, Haryana.

Project Information is as follows:

	Title	Description
1	Owner	NUCLEAR POWER CORPORATION OF INDIA LTD. (NPCIL)
3	Project Title	2X700MWe PHWR- GORAKHPUR HARYANA ANU VIDYUT PARIYOJNA UNIT# 1&2 – TG ISLAND PACKAGE
4	Project Site Location	Site is situated on the left bank of the Fatehabad Branch of Bhakra canal, in Fatehabad district of Haryana state. The nearest village to the site is Gorakhpur.
5	Site Access	Chandigarh, the State capital is about 250 km away from the site by road. National Highway No. 10 passes through Badopal village at a distance of 6 km from site. From Delhi the road to site via NH-10 passes through Rohtak, Hansi and Hisar.
6	Nearest Railway Station	The nearest railway station Uklana Mandi (Northern Railway) is about 23km away from the project site.
7	Nearest Airport	The nearest major airport is Delhi at about 208 km by road
8	Nearest Highway	NH10
9	Ambient Air Temperatures	a) Maximum dry bulb temperature : +48.4 deg C, b) Minimum dry bulb temperature: -0.1 deg C, c) Design temperature for electrical equipment / devices: +50 deg
10	Relative Humidity	a) Maximum during monsoon : 100% b) Minimum (design) : 5%
11	Air Quality	Air quality is clean and free from chemical pollutants.
12	Rainfall	a) Annual Average : 512 mm b) Highest annual rainfall : 787 mm in 1997 c) Lowest annual rainfall : 171.1mm in 2000 d) Period : Year 1969-2007
13	Wind Pressures	a) Height above mean ground level - @10M Design Wind Speed m/ sec - 62.81 b) Height above mean ground level - @100M Design Wind Speed m/ sec – 76.14 The assessment of wind loads based on the above basic wind speed shall be done as specified in IS: 875.
14	Wind Direction	Predominantly W,SW,NW & SE with respect to true North

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I: Project Information

15	Seismology	Zone III as per IS 1893-2002 part I

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

2.0 GENERAL SCOPE OF WORK

- 2.1** It is proposed to get detailed soil investigation done at the site of the Power Plant to establish various soil parameters to enable design of plant buildings, equipment and other structural foundations. Soil investigation work has to be carried out as per the details given in BOQ cum rate schedule, Technical Specification and drawings. Exact BOQ and locations of the Tests etc. will be informed before commencement of work.
- 2.2** Details of items shall be read in conjunction with the corresponding specification, drawings and other tender terms.
- 2.3** The bidder shall quote for finished items of work and shall provide all necessary power, water, instruments, fuel, tools and plants, tackles, materials, transport, labour, supervision and maintenance till handing over, repairs, rectifications, safety and security of their workmen and equipment including insurance etc.
- 2.4** All the field and laboratory tests shall be done in accordance with BHEL's soil investigation spec and relevant IS codes, whichever is more stringent.
- 2.5** The bidder shall submit a scheme showing the arrangement and equipment proposed to be used for conducting the work along with the rates.
- 2.6** BHEL Engineer's decision regarding clarification of items in the BOQ cum rate schedule with respect to other sections of the contract shall be final and binding on the contractor.
- 2.7** The complete works shall be carried out as per **BOQ cum Rate schedule**. If any work covered in the scope of contract cannot be executed using items available in BOQ, additional / extra items shall be made and rates for such items shall be worked out as per **GCC clause 2.15.7**. However contractor shall be bound to execute all the works under the scope of the contract and decision whether an extra item is applicable or not, shall be taken by BHEL Engineer, which shall be binding on the contractor.
- 2.8** In case the description / specifications as per BOQ are found to be incomplete, Indian Standard Codes (IS Codes) specifications shall be followed. Quantities mentioned in the BOQ cum Rate Schedules, are approximate only and liable for variation due to change of scope of work / variation in schedule of quantities, changes in design etc. The tenderers shall undertake to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

2.9 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.

2.10 Also included in the scope :

The scope broadly covers the following:

2.10.1 Carry out field tests in the form of test boring including drilling through rocks(if required), direct load tests, penetration tests, trial pits, tests for dynamic properties, electrical resistivity tests, block vibration test, laboratory tests etc. as listed in BOQ cum Rate Schedule.

2.10.2 Preparation and submission of preliminary report (in duplicate) containing firm recommendation on the type of foundation to be adopted. This report shall include details of bore-logs, trial pits, plate load tests, cone penetration tests, relevant dynamic tests etc. based on which the recommendations were arrived at. The recommendation shall be supported by necessary calculations.

2.10.3 Preparation and submission of Draft Final report (in triplicate) covering the entire scope of work and giving the recommendations as per the requirements.

2.10.4 Preparation and submission of Final report incorporating the comments of BHEL on the draft report. Eight (8) hard copies of the final report along with two (2) soft copy in CD of all annexure to the report (bore logs, graphs, tables, charts etc.) shall be submitted.

2.11 The work to be performed under this specification consists of providing labor, supervision, all materials, scaffoldings, Construction equipment, tool & plants, supplies, transportation and storage of all items including contractor's supervision and in accordance with drawings and specifications.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/ BHEL

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.0	ESTABLISHMENT			
3.1.1	FOR CONSTRUCTION PURPOSE:			
A	Open space for office and storage	Yes		BHEL shall provide free of charge limited open space for office and store as and where made available by its customer.
B	Establishment of bidder's office, canteen and storage building including supply of materials and other services, including office equipment, Firefighting equipment like buckets, extinguishers, fencing of storage area, office etc.		Yes	
3.1.2	FOR LIVING PURPOSES OF THE BIDDER			
A	Open space		Yes	Bidder has to make his own arrangement at his own cost.
B	Living accommodation		Yes	
3.2.0	ELECTRICITY			
3.2.1	<u>Electricity For construction purposes</u>		Yes	Bidder has to make his own arrangements for construction power as per requirement and may have to deploy DG sets at no extra cost to BHEL.
3.2.1.1	Single point source and further distribution for the work to be done which include supply of materials and execution.		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/ BHEL

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.2.2	<u>Electricity for the office, stores etc. of the bidder which include:</u>			
	a. Distribution from single point including supply of materials and service			
	b. Supply, installation and connection of material of energy meter including operation and maintenance			
	c. Duties and deposits including statutory clearances for the above		Yes	
	d. Living facilities for office use including charges			
	e. Demobilization of the facilities after completion of works			
	f. Electricity for living accommodation of the bidder's staff, engineers, supervisors etc. on the above lines.			
3.3.0	<u>WATER SUPPLY</u>			
3.3.1	<u>For construction purposes:</u>			
3.3.1.1	Making the water available at single point and distribution as per the requirement of work		Yes	Bidder has to an arrangement for construction water at his own cost by resorting to the methods like borewell (if permitted by the customer), water tankers etc.
3.3.2	<u>Water supply for bidder's office, stores, canteen etc.</u>		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III: Facilities in the scope of Contractor/ BHEL

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.3.2.1	Making the water available at single point distribution as per the requirement of work.		Yes	
3.4.0	LIGHTING			
3.4.1	For construction work (supply and execution of all the lighting work / arrangements) 1. At office storage area 2. At the construction site/area		Yes	
3.4.2	Providing the necessary consumables like bulbs, switches, etc. during the course of construction		Yes	
3.4.3	Lighting for the living purpose of the bidder at the colony/ quarters		Yes	
3.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
3.5.1	Telephone, internet, intranet, e-mail etc		Yes	
3.6.0	ENGINEERING WORKS FOR CONSTRUCTION:			
3.6.1	Providing the construction drawings for all the works covered under this scope	Yes		
3.6.2	Drawings for construction methods		Yes	In consultation with BHEL
3.6.3	Review of performance and revision of site construction schedules in order to achieve the end dates and other commitments	Yes	Yes	

3.7 Other important Conditions regarding facilities to be provided by BHEL / Contractor i.e. Space, Construction Power and Construction Water etc.:

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III: Facilities in the scope of Contractor/ BHEL

3.7.2 DRINKING WATER – Bidder shall provide drinking water at the work spot at their cost.

3.7.3 CONSUMABLES - All consumables, like gas, electrodes, chemicals, lubricants etc. required for the scope of work, shall be arranged by the contractor at his cost unless otherwise specifically mentioned in the contract.

In the event of failure of contractor to bring necessary and sufficient consumables, BHEL may arrange for the same at the risk and cost of the contractor. The entire cost towards this along with overhead shall be paid by the contractor or deducted from the contractor's bills.

3.7.4 DEWATERING - The bidder shall, prior to submitting his tender for the work, visit and examine the site of works and its surroundings at his own expense, and obtain & satisfy themselves about the limit and extent of surface and subsurface water to be encountered during the performance of the work, and the requirement of drainage and pumping.

Contractor shall ensure at all times that the work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL.

3.7.5 The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent manager having sufficient authority to take decisions at site.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV: T&Ps and MMEs to be deployed by Contractor

A. LIST OF TOOL & PLANTS TO BE DEPLOYED BY THE CONTRACTOR -

INDICATIVE LIST OF T & P TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST

Sl. No.	EQUIPMENT	QTY. (INDICATIVE)
1	Boring Rig for soil/ Rotary core Drilling Rig with accessories	2 NO. / APR
2	Static Cone Penetration Test Setup	1 NO / APR
3	Dynamic Cone Penetration Test Setup	1 NO. / APR
4	Equipment for Plate Load Test	1 NO. / APR
5	Equipment for Field Permeability Test	1 NO. / APR
6	Pressure meter Test Setup	1 NO. / APR
7	Seismic Refraction Test Set up	1 NO. / APR
8	Electrical Resistivity Test Setup	1 NO. / APR
9	Cross Hole Shear Test Setup	1 NO. / APR
10	Electronic Total Station & accessories	1 NO. / APR

*APR: As Per Requirement.

NOTES:

- 1 The above list is only indicative and these T&Ps may not be required for entire contract period but contractor will ensure that these T & Ps are provided as per need. Contractor will assess actual quantity and period of requirement based on his experience. **Contractor has to mobilize / maintain adequate numbers of equipment for meeting the work schedule and intermediate milestones as notified by BHEL Engineer.**
- 2 Other terms and conditions regarding T&Ps/ MMEs please also refer clause for T&Ps & MMEs in other Tender Specifications.
- 3 All the tools and plants required for this scope of work are to be arranged by the contractor within the quoted rates. The list is suggestive in nature. Any additional T&Ps required to be arranged by the contractor.
- 4 If work gets delayed due to non-availability of T&Ps, BHEL reserves the right to get the work done at the risk and cost of contractor without prejudice to rights of BHEL as in GCC.

NOT APPLICABLE

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.0 MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

6.1 INITIAL MOBILIZATION:

After receipt of fax letter of award, Contractor shall discuss with Project Manager/ Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 1 week of issue of fax LOA or as per the directive of Project Manager/ Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones as directed by BHEL Engineer.

6.2 START DATE / ZERO DATE:

The schedule date of start of work shall be the date after 1 week of issue of LOA. The Actual Date of Start of Contract Period (Zero Date) shall be date of handing over of site for work to contractor and shall be certified by the BHEL Engineer.

6.3 COMPLETION PERIOD:

The entire work **up to submission of Draft report** is to be completed within **1 month from the actual date of start of contract period (Zero Date)**. All the field works are to be tentatively completed within 20 days' time. Draft report to be submitted within 1 months from start date. Contractor has to mobilize adequate resources to meet BHEL's commitments to their customer as indicated from time to time.

6.4 The Final Report after incorporation of all BHEL comments, required revisions and modifications in Draft Report shall be submitted within one week of specific instructions by BHEL for the same.

6.5 Detailed Work completion schedule will be submitted for approval by the successful bidder within 1 week of issue of LOA.

6.6 In case due to reasons not attributable to the contractor, the work gets delayed and scheduled completion gets extended, time extension will be accordingly granted by BHEL.

6.7 The work under the scope of this contract is deemed to be completed in all respects, only when all the works are carried out as per satisfaction of BHEL. The decision of BHEL on completion date shall be final and binding on the contractor.

6.8 In order to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

6.9 This project is a fast track project. Customer is making all out efforts to advance the project schedule. No extra payment whatsoever shall be paid on this account.

6.10 CONSEQUENCE OF DELAY:

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - VII: Terms of Payment

7 TERMS OF PAYMENT

- 7.1** The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.
- 7.2** **The Contractor shall be paid monthly running bill as per Chapter – X of SCC and Clause Nos. 2.22 & 2.23 of GCC.** The format for billing shall be approved by BHEL before raising invoices.
- 7.3** The contractor on certification of the engineer at site be entitled for payments of his running bills which shall be subject to any deduction/ retention specifically under clauses 2.22 of GCC and 10.0 of SCC in addition to terms of payment as explained hereunder:
- a)** 75% of unit rate wise shall be payable on completion of site / lab investigation.
 - b)** 15% will be payable on submission of draft report.
 - c)** Balance amount shall be payable on acceptance of final reports and on submission and passing of final bill, clearing of site and completion of all contractual responsibilities.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter -VIII: Taxes and Other Duties

8 TAXES & DUTIES

8.1.1	Price quoted should be inclusive of all applicable Taxes/ charges but Excluding GST. The Contractor shall pay all other taxes, fees, royalty, commission etc. which may be levied on the contractor in executing the contract. In case BHEL is forced to pay any of such taxes, it shall be recovered from Contactor's bills or otherwise as deemed fit. GST Shall be payable extra as per following :
8.1.2	Contractor/ Vendor has to issue invoice indicating HSN/ SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder. With the implementation of e way bill provisions, contractor shall comply with same as applicable.
8.1.3	Vendor has to submit GST compliant invoice within seven days from the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/ LR/ RR to BHEL before movement of goods starts. Special care should be taken in case of month end transactions.
8.1.4	GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor :- a. Supply of goods and/ or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor.
8.1.5	TDS under GST law as applicable shall be deducted.
8.1.6	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/ interest/ penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder
8.1.7	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/ altered/ deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/ penalty shall be recovered from the Contactor's due payment.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

8.1.8	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
8.1.9	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract is limited to direct transactions between BHEL & its Contractor. BHEL is not responsible for any liability that may arise due to any transaction beyond the direct transaction between BHEL & its Contractor.
8.1.10	<u>Variation in Taxes & Duties:</u> Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability. In case the Government imposes any new levy/ tax on the output service/ goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its contractor only and within the contractual delivery period only. In case any new tax/ levy/ duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/ Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
8.1.11	<u>Modalities of Tax Incidence on BHEL:</u> Where GST law permits more than one option or methodology for discharging liability of tax/ levy/ duty; the contractor shall approach BHEL before choosing any option to discharge his tax liability. BHEL shall have the right to direct the contractor to adopt the appropriate option considering the amount of tax liability on BHEL as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.
8.2	BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter -VIII: Taxes and Other Duties

	In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under :-
8.2.1	It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.
8.2.2	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on gross payment made for value of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
8.2.3	It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.
8.2.4	It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.
8.2.5	The contractor shall, however ensure before deposit of any BOCW Cess, that customer is not depositing the same in order to avoid excess deposit of cess.
8.2.6	The contractor shall bear cost of BOCW cess either by way of deposit or through recovery by BHEL in case the same is deposited by the customer.
8.2.7	In case of failure in above mentioned compliances, BOCW Cess @ 1% as well as applicable penalty as specified in BOCW Act/ Rules shall be deducted from the contractor.

Note:

1	The Gross amount is to be construed as cost of construction in line with the provisions of the BOCW of the BOCW Cess act and in case of compliance by customer by way of deduction at source in line with clause No 3(2) of the act an equitable adjustment to the relatable cost of construction attributable to the bidder shall be made in terms of clause no 8.2 of TCC
2	In case compliance by customer by way of deduction at source in line with clause no 3(2) is not resorted to, the compliance of BOCW Cess act shall be ensured by the bidder in line with the provisions of BOCW Cess act in terms of clause no 8.2.2b of TCC

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

3	The bidder may consider the cost of construction for levy of BOCW Cess inclusive of GST, however, due to whatsoever reason if the GST does not form the cost of construction for levy of aforesaid Cess an equitable adjustment thereof shall be made to the contract price.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: Materials & Other Requirements

9.0 MATERIALS

- 9.1 The contractor shall, at his own expenses (Inclusive of Taxes), provide all materials required for the work.
- 9.2 All materials to be provided by the Contractor shall be of the best kind in conformity with the specifications laid down in the contract or as per relevant Indian standard and the Contractor shall, if requested by the BHEL Engineer, furnish proof to the satisfaction of BHEL Engineer that the materials so comply.
- 9.3 The Contractor shall, at his own expense and without delay, supply to the BHEL Engineer samples of materials proposed to be used in the works. The BHEL Engineer shall within seven days of supply of samples or within such further period as he may require will intimate to the Contractor in writing, whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the BHEL Engineer for his approval fresh samples complying with the specifications laid down in the Contract. Any delay in approval of samples (original or fresh ones) shall not make the contractor eligible for any compensation.
- 9.4 The BHEL Engineer shall have full powers for removal of any or all of the materials brought to site by the Contractor which are not in accordance with the Contract specifications or do not conform in character or quality to samples approved by him. In case of default on the part of the Contractor in removing rejected materials, the BHEL Engineer shall be at liberty to have them removed by other means. The BHEL Engineer shall have full powers to procure other proper material to be substituted for rejected materials and in the event of the Contractor refusing to comply; he may cause the same to be supplied by other means. All costs, which may attend upon such removal and / or substitution, shall be borne by the Contractor.
- 9.5 The Contractor shall indemnify BHEL, its representatives or employees against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any article or material or part thereof included in the Contract. In the event of any claim being made or action being brought against BHEL or any agent, servant or employee of BHEL in respect of any such matters as aforesaid, the Contractor shall immediately be notified thereof, provided that such indemnity shall not apply when such infringement has taken place in complying with the specific directions issued by BHEL but the Contractor shall pay any royalties or other charges payable in respect of any such use, the amount so paid being reimbursed to the Contractor only if the use was the result of any drawings / specifications issued after submission of the tender.
- 9.6 The BHEL Engineer shall be entitled to have tests carried out as specified in the Contract for any materials supplied by the Contractor other than those for which, as stated above, satisfactory proof has already been furnished, at the cost of the Contractor and the Contractor shall provide at his expense all facilities which the Engineer may require for the purpose. If no tests are specified in the Contract, and such tests are required by the Engineer, the

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: Materials & Other Requirements

Contractor shall provide all facilities required for the purpose and the charges for these tests shall be borne by the Contractor only. The cost of materials consumed in tests shall be borne by the Contractor in all cases except when otherwise provided.

- 9.7 In addition, the Contractor shall perform / submit at his own cost such tests / samples as may be required by the BHEL Engineer out of the materials used by the company except for the costs of materials used in such tests/ samples.
- 9.8 After acceptance of the Contract, if Contractor desires BHEL to supply any other materials, such material may be supplied by BHEL, if available, at rates to be fixed by the BHEL Engineer along with prevailing departmental charges. BHEL reserve the right not to issue any material. The non-issue of such material will not entitle the Contractor for any compensation whatsoever either in time or in cost.
- 9.9 Material required for the works, whether brought by the Contractor or supplied by BHEL, shall be stored by the Contractor only at places approved by the Engineer. Storage and safe custody of material shall be the responsibility of the contractor.
- 9.10 BHEL's officials concerned with the Contract shall be entitled at any time to inspect and examine any materials intended to be used in or on the works, either on the Site or at factory or workshop or other place(s) where such materials are assembled, fabricated, manufactured or at any place (s) where these are lying or from which these are being obtained and the Contractor shall give such facilities as may be required for such inspection and examination.
- 9.11 All materials brought to the Site shall become and remain the property of BHEL and shall not be removed off the Site without the prior written approval of the BHEL Engineer. But whenever the Works are finally completed and advance, if any, in respect of any such material is fully recovered, the Contractor shall at his own expense forthwith remove from the Site all surplus material originally supplied by him and upon such removal, the same shall re-vest in and become the property of the Contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X: Other Important Conditions

10.0 EXECUTION OF WORK

- 10.1 The work shall be executed in a workman like manner and to the entire satisfaction of the Engineer and as per technical specification issued with tender, IS codes, CPWD specifications as applicable. In case of conflict, the decision of the BHEL Engineer shall be final & binding.

10.2 SETTING OUT

- 10.2.1 All the works shall be set out to the true lines, grades and elevation indicated on the drawing. The contractor shall be responsible to locate and set out the works. Only one grid reference line and bench mark shall be made available for setting out the works under the contract. This reference lines shall be used as datum for the works under the contract and the contractor has to establish for his work area at available points horizontal and vertical control points. The contractor shall inform BHEL well in advance of the times & places at which he wishes to do work in the area allotted to him so that suitable datum points established by him are checked by BHEL / Customer to enable the contractor to proceed with the works. Any work done without being properly located may be removed and / or dismantled by BHEL / Customer at contractor's expenses.
- 10.2.2 The contractor shall at his own expense take all proper and responsible precautions to preserve and maintain these datum marks to its true position. In the event of these marks being disturbed or obliterated by accident or due to any other cause whatsoever, the same may be deemed necessary placed by BHEL / Customer at contractor's expenses.

10.3 SITE DRAINAGE

- 10.3.1 All water including sub-soil water which may accumulate on the Site during the progress of the works or in trenches and excavations, including monsoon period shall be removed by the contractor from the Site to the satisfaction of the BHEL Engineer. It will also be responsibility of the contractor to de-water all the foundation pits, trenches with suitable de-watering methods like, pumping out, well point system etc. Considering the depth of water table at plant site. All such expenditure on de-watering shall be deemed to be included in quoted rates.

10.4 INSPECTION AND STAGE APPROVAL OF THE WORK

- 10.4.1 The owner or his duly authorized representative shall have at all reasonable times access to the contractor's premises or works and shall have the power to inspect drawings or any portion of the work, examine the materials and workmanship and shall have the authority to reject any work. This would be implemented through joint inspection by the representative of the owner and BHEL and in the form of joint protocols without any extra claims and loss of time and amount.
- 10.4.2 All work embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice in writing to the Engineer when each stage is ready. In default of such notice being received, the Engineer shall be entitled to approve the quality and extent thereof at any time he may choose and in the event of any dispute, the decision of the Engineer thereon shall be final and conclusive.

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10.5 UNCOVERING AND MAKING GOOD

- 10.5.1 The Contractor shall uncover any part of the Works and/ or make openings in or through the same as the BHEL Engineer may from time to time direct for his verification and shall reinstate and make good such part to the satisfaction of the BHEL Engineer. If any such part has been covered up or put out of view after being approved by the BHEL Engineer and is subsequently found on uncovering to be executed in accordance with the Contract, the expenses of uncovering and / or making opening in or through, reinstating and making good the same shall be borne by BHEL. In any other case all such expenses shall be borne by the Contractor.

10.6 NUISANCE

- 10.6.1 The Contractor shall not at any time do, cause or permit any nuisance on Site or do anything which shall cause unnecessary disturbance or inconvenience to owners, tenants or occupiers of other properties near the Site and to the public generally.

10.7 MATERIAL OBTAINED FROM EXCAVATION

- 10.7.1 Materials of any kind obtained from excavation on the Site shall remain the property of BHEL / its client and shall be disposed of as the BHEL Engineer may direct.

10.8 TREASURE, TROVE, FOSSILS etc.

- 10.8.1 All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site shall be the absolute property of BHEL / BHEL's client and the Contractor shall take reasonable precautions to prevent his workmen or any other person from removing or damaging any such article or thing and immediately upon discovery thereof and before removal, acquaint the BHEL Engineer with such discovery and carry out the BHEL Engineer's directions as to the disposal of the same.

10.9 PROTECTION OF WORKS

- 10.9.1 Trees designated by the BHEL Engineer shall be protected from damage during the course of the Works and earth level within 1 meter of each such tree shall not be charged. Where necessary, such trees shall be protected by providing temporary fencing.
- 10.9.2 The contractor shall provide and maintain at his own expense all lights, guards, fencing and watching when and where necessary or required by the BHEL Engineer for the protection of the Works or for the safety and convenience of those employed on the Works or the public.
- 10.9.3 The contractor shall have total responsibility for protecting his works till it is finally taken over by the BHEL. No claim will be entertained by the BHEL for any damage or loss to the contractor's works and the contractor shall be responsible for the complete restoration of the damaged works to its original condition to comply with the specifications and drawings. Should any such damage to the contractor's works occur because of other party not under his supervision or control, the contractor shall make his claim directly with the party concerned. The contractor shall not cause any delay in the repair of such damaged works

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because of any delay in the resolution of such disputes. The contractor shall proceed to repair the work immediately and no cause thereof will be assigned pending resolution of such disputes.

10.10 PROTECTION OF EMBEDMENTS, BOLTSETC.

10.10.1 The contractor shall ensure proper protection to the satisfaction of the BHEL Engineer, of all bolts, inserts, embedment etc. from weather etc. by greasing, rapping them with gunny bags or canvas or by any other means as directed by BHEL Engineer. Cost of such protections shall be deemed to be included in the rates quoted for the item.

10.11 CLEARANCE OF SITE AND REPAIRS.

10.11.1 Contractor has to clear the site / area where mechanical / storage and electrical erection work is to be commenced / or in progress. The contractor shall remove construction materials and equipment lying in the vicinity and causing obstruction in the erection work within 24 hrs. notice, In case he fails to clear the site, this will be done at his risk & cost by BHEL.

10.12 QUALITY ASSURANCE

10.12.1 The contractor has to establish / arrange at site the field testing facilities for testing of civil construction materials and concrete cubes for ensuring the proper quality, grade and strength of the materials used in the construction in line with approved field quality check list/ relevant IS Code specifications as specified by BHEL Engineer. Contractor has to submit detailed report for testing of all material used etc. All testing shall be done as per IS code specifications/ BHEL's quality plan. If further test is required by the engineer to be carried from outside laboratory, the cost of the same shall be borne by the contractor.

10.13 COMPLETION OF WORK

- 10.13.1 The works shall be completed to the entire satisfaction of the BHEL Engineer and in accordance with the completion schedule as specified in the Contract, and all unused stores and materials, tools, plant, equipment, temporary buildings, site office, labour hutments and other things shall be removed and the site and work cleared of rubbish and all waste materials and delivered up clean and tidy to the satisfaction of the BHEL Engineer at the Contractor's expenses.
- 10.13.2 BHEL shall have power to take over from the Contractor from time to time such sections of the work as have been completed to the satisfaction of the BHEL Engineer. Such work however shall not be treated as have been completed until the extra works are executed to the satisfaction of BHEL Engineer.

10.14 COMMENCEMENT OF GUARANTEE PERIOD

10.14.1 The Guarantee period shall commence only after completion & handing over of the entire works. The BHEL Engineer shall certify to the contractor the date on which the work is

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completed & handed over and the date thereof for commencement of Guarantee Period. The duration of Guarantee Period shall be as per GCC.

10.15 METHOD OF MEASUREMENT

10.15.1 Method of measurements if not specified in the tender, shall be as per relevant IS Codes / CPWD codes.

10.16 HSE& OHSAS:

10.16.1 The contractor shall comply with the requirements / stipulations of Chapter-IX of SCC towards Health, Safety and Environment.

10.17 DISCREPANCIES AND ADJUSTMENT OF ERRORS:

10.17.1 The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawings and figures dimensions in preference to scale and special conditions in preference to general conditions.

10.17.2 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.

10.17.3 Any error in description, quantity in schedule of quantities or any omission therefrom shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to the drawings and specifications or from any of his obligations under the contract.

10.18 MODIFICATION/ DELETION OF GCC & SCC CLAUSES:

10.18.1 Changes proposed in GCC:

- A. Clause No. 2.12 of GCC (ORC) shall not be applicable.
- B. Clause No. 2.17 of GCC (PVC) shall not be applicable.
- C. Clause No. 2.13 of GCC (Interest bearing recoverable advance) shall not be applicable.

10.18.2 Changes proposed in SCC:

- A. Clause No. 4.1.4, 4.1.9 & 4.1.10 of SCC (Consumables & Other Items) shall not be applicable.
 - B. Clause No. 4.2.2 of SCC (Obligations in respect of T&Ps and MMEs provided by BHEL) shall not be applicable.
 - C. Clause No. 8.3.2, 8.3.3 and 8.3.4 of SCC (Statutory Inspection of Work) shall not be applicable.
 - D. HSE Plan for Site Operation by Sub-Contractor ("Document No. HSEP 14 Rev. 01")
- Clause No. 7.1, 8.4.4, 8.4.6, 8.4.8, 8.4.9, 8.4.10 & 11.3.6 shall not be applicable.

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Chapter-XI: Annexures

Annexure-I: BOQ cum Rate schedule for the Work of “GEOTECHNICAL INVESTIGATION FOR 2X700MWe PHWR- GORAKHPUR HARYANA ANU VIDYUT PARIYOJNA UNIT# 1&2”

Annexure-II: NPCIL SAEFTY GUIDELINES

- a) Contract Conditions for Industrial Safety
- b) AERB Safety Guidelines (Control of Works)

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Part-II: Technical Specifications

Following Documents are attached as Part-II: Technical Specifications of Technical Conditions of Contract (Volume-IA: TCC)

Sl. No.	Description	Document No.	No. of Sheets
1	Standard Specifications for Geotechnical Investigation	Specification No. PE-TS-999-603-002	51
2	Tender Drawing- Geotechnical Investigation Layout	Drawing No. PE-DG-485-602-002	1

BOQ CUM RATE SCHEDULE- GEOTECHNICAL INVESTIGATION						
NAME OF WORK: GEOTECHNICAL INVESTIGATION FOR 2x700MWe GORAKHPUR HARYANA ANU VIDYUT PARIYOJNA UNIT#1&2						
SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY.	FACTOR	RATE (Rs.) = FACTOR (F) * A / 1000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE * QUANTITY
GEO-TECHNICAL INVESTIGATION						
1	Mobilisation of necessary equipments, men and materials to the project site for carrying out the geotechnical investigation and demobilisation of the same after completion of all the field works etc all complete as per specification, drawings and as directed by the engineer-in-charge.	LS	1	246.449020		
2	Making 150mm nominal diameter bore hole up to a maximum depth of 70 m below ground level at various locations in all types of soil including laterite, soil cement stabilized earthfill etc. using suitable approved method of boring including chiselling, cleaning, providing casing pipes as required or as directed, performing standard penetration test at every 3.0m interval alternate to collection of undisturbed soil samples, at change of strata and at depths wherever undisturbed soil samples could not be collected, collection of undisturbed sample (UDS) at every 3.0m interval alternate to conducting standard penetration test; collection of disturbed soil samples and water samples, sealing and packing of samples, observation such as ground water table etc; transportation of all the collected samples to the laboratory and back filling of boreholes with sand on completion of the same etc all complete as per specification and as directed by the engineer-in-charge.	RM	420	0.589920		
3	Excavating trial pit of size 3m x 3m at various locations upto a maximum depth of 1m below founding level in all types of soil, soil cement stabilized earth fill etc. which can be excavated with pick axe/crow bar etc including sheeting or shoring the sides for the purpose of stability, dewatering and maintaining the pit dry at all times, collecting disturbed/undisturbed samples and conducting field density test at 1m interval, starting from 1m depth below ground level and transporting all the collected samples to the laboratory; backfilling of the pit with excavated material etc all complete as per specification and as directed by the engineer-in-charge.	CuM	72	0.190420		
4	Conducting plate load test in various locations at specified depth below ground level complete as per specification, drawings and as directed by the engineer-in-charge. Payment for making the pit of suitable size, maintaining it dry and backfilling etc shall be paid separately as per item no.4.	Each	2	11.625440		
5	Conducting electrical resistivity test at various locations complete as per specification, drawings and as directed by the engineer-in-charge.	Each	4	2.179430		
6	Conducting pressure meter test in bore hole at 5m, 10m, 15m, 20m, 25m, 30m, 35m, 40m, 45m, 50m, 55m, 60m, 65m and 70m depth below ground level in all type of strata including drilling and preparation of bore hole of required size etc all complete as per specification, drawings and as directed by the engineer-in-charge.	Each	2	88.258370		
7	Conducting cross hole shear wave test in bore hole in all types of strata, soil cement stabilized earth fill etc. at 5m, 10m, 15m, 20m, 25m, 30m, 35m, 40m, 45m, 50m, 55m, 60m, 65m and 70m depth below ground level including drilling and preparation of required number of bore holes, providing PVC liner, grouting and backfilling with sand after completion of the test etc all complete as per specification, drawings and as directed by the engineer-in-charge.	Each	2	84.111780		
8	Conducting laboratory test on soil samples at an approved laboratory including preparation of soil samples to determine the following properties etc all complete as per specification.					
a)	Bulk density and moisture content	Each	40	0.060310		
b)	Sieve analysis	Each	45	0.077940		
c)	Hydrometer analysis	Each	20	0.078300		
d)	Liquid limit and plastic limit	Each	45	0.081120		
e)	Shrinkage limit	Each	10	0.066670		
f)	Specific gravity	Each	20	0.080660		
g)	Swell pressure	Each	15	0.158440		
h)	Free swell index	Each	15	0.126370		
i)	Relative density	Each	15	0.518950		
j)	Unconfined compressive strength	Each	10	0.124790		
k)	Direct shear test	Each	15	0.144360		
l)	Triaxial shear test					
i)	Unconsolidated undrained test	Each	20	0.147570		
ii)	Consolidated undrained test	Each	20	0.147570		
iii)	Consolidated drained test	Each	20	0.147570		
m)	One dimensional consolidation test	Each	10	0.277400		
n)	Standard Proctor compaction test	Each	5	0.755300		
o)	CBR Test	Each	6	1.160980		
p)	Chemical analysis	Each	5	0.509500		
9	Conducting chemical test on water samples to determine the carbonate, sulphate, chloride and nitrate contents, pH value, turbidity, organic matter and any other chemicals harmful to foundation material etc all complete as per specification.	Each	4	1.256070		
10	Preparation and submission of draft report in 3 copies and final report in 8 hard copies and 2 soft copies on CD after the approval of draft report including all field records, laboratory test results, graphs, analysis of test results, photo graphs showing details of field tests/soil/rock samples/Trail pits and recommendation etc all complete as per specification.	LS	1	56.538880		
Total Amount (A)						
NOTES:						
1	Bidder's quoted price above shall be complete in all respect for the full scope defined in specification and in accordance with all terms & conditions of tender.					
2	Contractor shall fully understand description and Specifications of items mentioned in BOQ.					
3	Conditional price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.					
4	Quantities mentioned in rate schedules are approximate only and liable for variation on either side depending upon site / design requirement. The tentative contract value (CV) of entire scope of work shall be calculated as per finally quoted / accepted rates & the Quantities indicated in BOQ cum Rate Schedule .					
5	Contractor's total quoted price as per rate schedule will be taken as tentative only. The contractor undertakes to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same.					
6	In case of any mis-match in rate and amount on price discrepancy, the same will be dealt as per clause no. 1.4 of GCC.					
7	Taxes (GST) shall be payable extra as per relevant clause in Technical Conditions of Contract.					

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1.0 Applicability:

The safety clauses are applicable to Engineering, Procurement and Construction Contracts.

2.0 Safety Guidelines:

- 2.1 The contractor shall provide and maintain all lights, fencing, guards, warning signs and caution board and similar items as required ensuring safe working conditions at work site.
- 2.2 The contractor and his sub-contractor shall comply with the instructions given by departmental safety officer or his representative(s) regarding safety precautions, protection measures and housekeeping etc.
- 2.3 The contractor shall comply with all provisions of “AERB Safety Guide for Works Contract” Document No. AERB/SG/IS-1 and other safety requirements as applicable to specific site. A copy of the guide can be obtained from NPCIL on request.
- 2.4 The contractor shall provide proper access and working platforms for all place of work as per laid down standards or as advised by Engineer-in-charge or Head-IS&F.
- 2.5 The contractor shall ensure that all floor openings in his work are guarded/barricaded during the course of work and at the end of each day’s work.
- 2.6 The Contractor shall meet statutory requirements as well as regulatory requirements applicable to the project, in general, and NPCIL in particular, especially the requirements as per Factory Act-1948 (amended in 1987), Atomic Energy factories Rule-1996 (AEFR-1996 or latest version available at the time of work execution), safety guidelines for Job Hazard Analysis (JHA) & AERB notifications on Industrial & Fire safety. The copies of the same can be obtained from NPCIL on request.
- 2.7 The contractors’ safety professionals shall be well aware about Acts, Rules connected with Industrial Safety and practices particularly applicable to the project and to that effect they have to undergo an assessment at the project within 15 days of their placement at the project at the cost of the contractor and then only he/she would be given permanent entry pass to plant and considered in the required strength of the safety professionals.
- 2.8 Workers in general shall not be deployed at work for more than 10 hrs/day and in no case more than 12 hrs/day.
- 2.9 All PPE procured and provided to workers shall conform to relevant Indian Standards and should be maintained in healthy condition by suitable storage, maintenance and inspection.
- 2.10 The contractor shall be held responsible for non-compliance of any of the safety measures, injuries, fatalities and compensation arising out of such situations or accidents, and shall be liable as per the Part-B clauses.

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3.0 Employees Safety & Workmen Compensation:

Contractor shall be responsible for safety of all his employees during execution of the contract work. As per Workmen's Compensation Act, 1923 (Amended in 2000), the contractor will ensure the payment of compensation to his employees in case of an accident as early as possible within the time frame permitted by the law of land.

4.0 Safety organization of the contractor

4.1 Every contractor shall have an Industrial safety organization having qualified safety professionals as enumerated below prior to the execution of job at project. The minimum numbers of safety professionals shall be

- (i) One graduate engineer having post/advance diploma in Industrial safety – for every 1000 workers or part thereof.
- (ii) Two numbers of safety supervisors having diploma in engineering and diploma in Industrial safety or at least 6 years experience should be in each shift for every 1000 workers or part thereof. Additional one supervisor for every 500 workers.

4.2 The above is the minimum requirement of safety professionals. The Head (Industrial Safety and Fire) henceforth be termed as Head-IS&F, of the plant, can ask for more safety professionals depending upon nature of jobs being executed by the contractor.

4.3 Contractor's safety professionals shall technically report to Departmental safety organization under Head-IS&F at plant site. However, administrative control and management of safety in the contract work would be the responsibility of the contractor. A committee consisting of representatives of QA, Training and Industrial Safety Group of Headquarters would carry out the verification of safety professional qualification/competence time to time at site.

4.4 In case contractor fails to employ the required safety professionals, the department may at the cost and risk of the contractor deploy additional/required safety professionals. The cost incurred towards this shall be deducted from contractor's bill at following the rates.

1. Safety Engineer = Rs. 1500/day.
2. Safety Supervisor = Rs. 1000/day.

If the required safety professionals are not employed within a month of date of the observation/inspection the payment to the contractor shall be regulated as per S.No. 1 of Annexure-1 applicable for safety professionals

5.0 Job Supervision at site

5.1 The contractor must ensure adequate job supervision through educated, qualified and experienced supervisors - at least one supervisor for each hazardous job activity to ensure safety during work execution. Similarly, there should be adequate on-site engineering support ensuring coverage of atleast one experienced engineer for every ten supervisors and part thereof.

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- 5.2 In case, the contractor is unable to arrange required work supervisors and engineers for work technical support, a penalty of Rs 10000/- per month for each vacancy will be levied and such five penalties in a year will attract additional fine on him up to Rs 100000/- apart from the payment he has to make for cost of departmental effort to supplement the requirements as specified at 5.1 above. The decision of the Engineer-in-charge, in regard to the penalty imposed shall be final and binding. However, before imposition of penalty, a fair opportunity of being heard, shall be provided to the contractor. The payment under this clause would be adjusted in Clause- 10.

6.0 Training requirements

- 6.1 **Every Mega Package Contractor or large contractor must build all necessary infrastructure for imparting induction safety training, mock-up trainings and job specific training at plant site at his cost.** The required space will be provided free of cost by NPCIL. The Training matters will be guided by Head, IS&F and will be monitored by Training Superintendents. The training evaluation for its effectiveness, will be assessed by nominee of Training Superintendent, QA and/or Head IS&F. The contractor site-in-charge should arrange induction safety training of four hours duration to all workmen prior to engaging them to work and refresher training on monthly basis covering 20% of the workman in a month with 100% coverage within 6 months. This training should be given with necessary Audio, Visual, Posters aids and as per syllabus approved by NPCIL safety group, under the guidance of Training Superintendent or Head IS&F or his representative. The training should be in the language understandable to workmen. This training shall include mock trials of wearing of helmet, use of safety belt and it's hooking up to an independent lifeline etc. The safety-training instructor must certify the workmen for having understood safety aspects and use of PPEs successfully in mockup trial. To ensure proper understanding of safety instructions and safety training, the contractor shall employ literate (at least able to read safety instructions) workers only. In exceptional cases of not meeting literacy requirement the workers shall be imparted supplementary training.
- 6.2 The job supervisors and the engineers will have to undergo detailed safety training of at least three days duration at the plant in safety supervision and accident prevention techniques. This training would at the cost of the contractor and then only he/she would be given permanent entry pass to plant.
- 6.3 **Contractor must note that in case the industrial safety induction training as per 6.2 is not conducted within 3 days his workmen shall not get plant entry pass.**

7.0 Requirements and specification of PPEs Tools and Tackles

- 7.1 Every contractor must keep adequate stock of ISI certified (or of relevant international standards) personal protective equipment (PPE), safe working tools and safe working appliances like platforms and access ladders, guard railing etc. and shall ensure these are used during the job for safe execution of the work. These PPE, Tools and Appliances must

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be inspected quarterly. Contractor on demand by NPCIL Authorities shall produce the record of such inspections.

- 7.2 All implements being used for height work like scaffold, access stairs/ladders, platform, railings etc. should be of ISI marked material meeting requirements of AEFR-1996 and should be certified by contractor safety professional prior to its safe use and to the effect that each implement should have display showing it can be safely used.
If any workman is found using sub-standard or damaged PPE, tools & appliance, or any unsafe condition/practices is observed it will be recorded for regulation of payment under clause-10. The decision of the Engineer-in-charge, in regards to the regulation of payment shall be final and binding.

8.0 Work Practices

- 8.1 The Pre Job Briefing, prior to taking up the work, will be carried out by contractor Safety Engineer/Supervisor to all workers using plant guidelines. The Contractor shall make arrangements for adequate and qualified supervision using checklists during the execution of jobs. The contractor shall ensure that all his workmen must take safety permit for each high-risk job as per project procedure.
If any hazardous work is found without safety work permit/ JHA/ safe working procedure, it will be recorded for regulation of payment under clause-10. The decision of the Engineer-in-charge, ~~in~~ with regard to the regulation of payment shall be final and binding.
- 8.2 Contractor working at height of more than 2.5 meter above stable floor or ground floor must acquire height pass as per procedure including the worker's medical fitness certificate by certifying surgeon (having MBBS qualification) and worker's height qualification etc.
If in any height work, the worker is found working without having height pass, it will be recorded for regulation of payment under clause-10. The decision of the Engineer-in-charge, ~~in~~ with regard to regulation of payment shall be final and binding.
- 8.3 Contractor shall ensure safe movement of man and material as well as vehicles in site premises as per rules/regulations applicable at or issued by plant. In case of violation of the rules/regulation, it will be recorded for regulation of payment under clause-10. The decision of the Engineer-in-charge, with regards to the regulation of payment shall be final and binding.

9.0 Safety Plan

- 9.1 Contractor at his cost shall perform following tasks for the jobs having high risk as identified by Departmental Safety Group:
- Prepare Safe Working Procedures and ensure its implementation in field.
 - Carry out Job Hazard Analyses (JHA) and implement in field.
 - Based on JHA, the safe working procedures should be modified especially to include checklists as necessary checkpoints for job safety supervision.
 - Worker(s) must be trained based on the safe working procedure and explained about DOs & DON'Ts prior to assigning him the job.
 - The workers must adhere to the safe working procedure for the job.

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- (vi) Contractor shall ensure that all Tools, Appliances, erecting equipment and their safe use by the contractor work force shall be meeting Indian standards. The contractor must ensure that necessary authorization exist with workmen prior to their deployment on a particular appliance/tool/equipment. The workmen would be required to acquire additional authorization for crane operation, crane signaling, blasting operation, welding and cutting operation, electrical work etc. and then only workmen shall be deployed for such job. He shall maintain all record of tools and equipment for their healthiness and safe use with a copy to departmental safety group.
- (vii) Employing of any sub-contractor by the main contractor shall be with concurrence of plant authorities & Engineer-In-Charge as per applicable procedure of the plant. The main contractor shall ensure that all safety requirements/conditions are effectively communicated to and well understood by his sub-contractor. The main contractor should ensure safety training & availabilities of required PPEs and he will be responsible for the safety of the workmen of his sub-contractor.

10 Payments Linked with Safety Performance

- 10.1 2% of the payment of the value of work order or RA Bills shall be based on **Safety Performance** as per above clauses-4.1, 4.2 & 4.4; 5.2, 6.1 to 6.4; 7.1 to 7.3; 8.2, 8.4 and 8.5 during the contract period. The checklist No. NPCIL/04710/Safety/2006/M/Checklist No.2 (attached at Annexure-I) shall be applicable for regulation of 2% safety linked payment which shall be duly certified by the committee consisting of the representative of Head (IS &F), QA and Engineer-in-charge.
- 10.2 The deduction towards other clauses, e.g. Penalties for serious accidents as defined under clause-11, and workman compensation as defined under ~~in~~ clause-3 of Part-A will be in addition to payments regularized under clause 10.1

11.0 Penalties for Serious Accidents

Following shall be the penalties for each category of serious accident:

- (i) For each Serious accident (Loss of man days 21 or more) - Rs. 10,000/-.
- (ii) For ~~a~~ each fatality – Rs.10, 00, 000/-

12.0 Safety performance Record

On completion of the contract work, a safety performance certificate of the safety record during the execution of the work will be jointly made by Engineer-in-charge, Head (IS&F) and QA representative and that shall be referred in future contract evaluation. Certificate shall be based on Annexure-I and Serious Accident record.

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Annexure – I
NPCIL/04710/Safety/2006/M/Checklist No. 02
Checklist cum Certificate for RA Bill payment based on Safety Performance

Sr. No.	Safety Parameters	Safety Clause	% of Running Account (RA) bill for safety compliance	Actual payable
01.	Safety Professional Required nos. of Safety Professional employed as per clause.	4.1, 4.2 & 4.4	0.4% of RA Bill (Max.) 0.0% if requisite no. of Safety Professionals are not posted at site within one month.	
02	Job Supervision at site Required nos. of Job Supervisors employed as per clause.	5.2	0.1% of RA Bill (Max.) 0.0% if requisite no. of Job Supervisors are not posted at site within fifteen days.	
03.	Safety Training i) Safety training imparted to all employees (100%). ii) Safety training imparted to < 80% of its employees.	6.1 to 6.4	0.4% of RA Bill (Max.) 0.0% of RA Bill	
04.	Use of proper PPEs & tools, Safe working condition/practices.	7.1 to 7.3	0.3% (Max.) of RA Bill 0.0% of RA Bill if more than ten nos. of unsafe conditions/ practices observed.	
05.	Work Practices 4.1 Adherence to Pre-job Briefing, JHA, Safety Work Permit & Safe Working Procedure for Hazardous works 4.2 All employees working at height have height pass.	8.2 8.4	0.3% of RA Bill (Max.) 0.0% of RA Bill value for > 5 cases as per condition given in clause 8.2. 0.3% of RA Bill (Max.) 0.0% of RA Bill value for > 5 cases as per condition given in clause 8.4.	
06	<u>Safe movement of man and material</u> as per rule and regulation applicable at the site.	8.5	0.2% of RA Bill (Max.) 0.0% of RA Bill if more than 5 violations were observed in a month as per clause 8.5	

Payment certified by :

Engineer-in-Charge (Works)

QA Representative

Head (IS & F)



GOVERNMENT OF INDIA

AERB SAFETY GUIDE

SAFETY GUIDE FOR WORKS CONTRACT

ATOMIC ENERGY REGULATORY BOARD

SAFETY GUIDE
FOR
WORKS CONTRACTS

Government of India
Atomic Energy Regulatory Board
Bombay – 400 095

August 1991

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III

FOREWORD

Generally the number of accidents are more during construction phase of a Project. These accidents involve mostly contractor workers. A need for a single document in the form of a guide or a manual defining the work situations during construction phase and the required safety precautions/procedures/equipment to be taken/followed/used was recognized by DAE SRC. In its meeting No. 259 held on 5th February, 1986, a Committee with Shri K.S. Somayaji as the Convenor was constituted to look into the type of accidents occurring during construction phase and also to evolve a guide to contain safety precautions that are required to be taken in the construction activities.

This Sub-Committee's report was discussed by DAE SRC in its meeting No. 271 held on 18th June 1986 but unfortunately could not be finalized. On January 3, 1990, this document was circulated to all the units of DAE and also to members of SARCOP for their comments. Several units and members of SARCOP have given their comments and these comments were further reviewed by another Group in consultation with Shri K.S. Somayaji. This Group eventually finalized the guide in its present form taking note of the comments from all the agencies.

In this guide certain qualitative terms like adequate, minimum, near, suitable, good quality, sufficient, etc. have been used, since it is not possible to quantify them for the varied nature of jobs that are being handled at the construction sites. It is recommended that the Safety Engineer and the concerned Engineer In-Charge may be consulted for their better judgment on meeting the qualitative requirements.

IV

This guide was finally discussed at SARCOP Meeting No. 88 held on 22nd August, 1990 and was approved. Every unit of DAE and its Undertakings are required to use the document as a guide to be followed in the award of works contracts to the contractors for compliance with the safety precautions laid down. It is incumbent that this guide be included as part of the tender document for effective compliance.

SARCOP places on record its appreciation for the interest shown by various agencies and individuals in scrutinizing the draft and sending their comments. SARCOP also places on record its appreciation of the time and effort put in by the Committee and the Group to bring this guide in its final form.

(S.D. Soman)
Chairman, AERB

Bombay
August 1991

SAFETY GUIDE FOR WORKS CONTRACT

1. INTRODUCTION

Many of the works of Department of Atomic Energy at its various sites are executed by the contractors. During these works, contractors personnel are likely to be exposed to different types of hazards. Similarly, unsafe acts of contractors personnel may generate hazards for Departmental staff and/or workmen of other contractors working at the site. Such unsafe acts may also pose danger to the existing installations and even to members of public. This guide is prepared to facilitate safe working during execution of contract works. It is hoped that units of DAE may issue this guide as a part of contract documents while awarding contracts.

2. GENERAL SAFETY PROVISIONS

- 2.1 The Contractor shall take all safety precautions during the execution of awarded work and shall maintain and leave the site safe at all times. At the end of each working day and at all times when the work is temporarily suspended, he shall ensure that all materials, equipment and facilities will not, cause damage to existing property, personal injury or interfere with the other works of the Project or Station. The Contractor shall comply with all applicable provisions of the safety regulations, clean up programme and other measures that are in force at the site.
- 2.2 The Contractor shall provide and maintain all lights, guards, fencing, warning signs, caution boards and other safety measures and provide for vigilance as and where necessary or as required by the Engineer-in-charge or by any duly constituted authority for the protection of workers or for the safety of others. The caution boards shall also have appropriate symbols.
- 2.3 Adequate lighting facilities such as flood lights, hand lights and area lighting shall be provided by the Contractor at the site of work, storage area of materials and equipment and temporary access roads within his working area. The Contractor shall obtain written approval of the Engineer-in-charge to the lighting scheme and place of tapping prior to its installation.
- 2.4 The Contractor shall plan his operations so as to avoid interference with the other Departmental works, other Contractors or sub-Contractors at the site. In case of any interference, necessary coordination shall be sought by the contractor from the Department for safe and smooth working.

2.5 The Contractor and his sub-contractor, if any shall comply with the instructions given by the Safety Engineer or his authorized nominee regarding safety precautions, protective measures, house keeping requirements, etc. The Safety Engineer with due intimation to Engineer-in-Charge shall have the right to stop the work of the Contractor, if in his opinion proceeding with the work will lead to an unsafe and dangerous condition. Engineer-In-Charge shall get the unsafe condition removed or provide protective equipment at the contractors cost. The contractor can employ his own Safety Engineer or nominate one of his officers for liaison with Departmental Safety Engineer for ensuring compliance of all safety rules. Contractor shall ensure that all his workmen are aware about the nature of risk involved in their work and have adequate training for carrying out their work safely.

2.6 The contractor shall be held responsible for non-compliance of any of the safety measures and delays, implications, injuries, fatalities and compensation arising out of such situations or incidents.

3. TRAFFIC

3.1 The Contractor shall conduct his operations so as to interfere as little as possible with the use of existing roads at or near locations where the work is being performed.

3.2 When interference to traffic is inevitable, notice of such interference shall be given to the Engineer-in-charge well in advance (atleast 48 hours) with the details of start of the work and time required, storage of materials, and details of the proposed methods of providing the required facilities for safe and continuous use of roads and obtain his clearance.

3.3 The Contractor shall, at his own expense, make such approved temporary provisions as are required to maintain atleast one lane of traffic by bridging the excavation, providing ramps over surface obstructions or providing suitable temporary bye-pass around the obstructions. The Contractor shall exercise full care to ensure that no damage is caused by him or his workmen, during the operation, to the existing water supply, sewerages, power or telecommunication lines or any other services or works. The Contractor shall be required to provide and erect before construction, substantial barricades, guard-rails, and warning signs. He shall furnish, place and maintain adequate warning lights, signals, etc., as required by Engineer-in-charge.

4. SAFE MEANS OF ACCESS

- 4.1 Adequate and safe means of access and exit shall be provided for all work places, at all elevations. Using of scaffolding members (avoiding a ladder) for approach to high elevations shall not be permitted.
- 4.2 Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short duration work as can be done safely from ladders. Ladder shall be of rigid construction having sufficient strength for the intended loads and made either of good quality wood or metal and all ladders shall be maintained well for safe working condition. An extra mazdoor shall be engaged for holding the ladder if ladder is not securely fixed. If the ladder is used for carrying materials as well, suitable foot holds and hand holds shall be provided on the ladder. The ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical). Ladders shall not be used for climbing carrying materials in hands. While climbing both the hands shall be free.
- 4.3 Scaffolding or staging more than 3.5 m above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a standard guard rail properly attached, bolted, braced or otherwise secured at least 1.0 m high above the floor or platform of such scaffolding or staging. The guard rail shall extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of materials. Standard railing shall have posts not more than 2 m apart and an intermediate rail halfway between the floor or platform of the scaffolding and the top rail. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure. Scaffolding and ladder shall conform to relevant IS specification (IS 3696-1966). Timber/Bamboo scaffolding shall not be used.
- 4.4 Working platforms of scaffolds shall have toe boards atleast 15 cm in height to prevent materials from falling down.
- 4.5 A sketch of the scaffolding proposed to be used shall be prepared and approval of the Engineer-in-charge obtained prior to start of erection of scaffolding. All scaffolds shall be examined by Engineer-In-Charge before use.
- 4.6 Working platform, gangways and stairways shall be so constructed that they shall not sag unduly or unequally and if the height of the platform or gangway or stairway is more than 3.5 m above ground level or floor level, they shall be closely boarded, shall have adequate width for easy

movement of persons and materials and shall be suitably guarded as described in 3.3 above.

- 4.7 The planks used for working platform shall not project beyond the end supports to a distance exceeding four times the thickness of the planks used. The planks shall be rigidly tied at both ends to prevent sliding and slippage. The thickness of the planks shall be adequate to take load of men and materials and shall not collapse.
- 4.8 Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing, the minimum height of which shall be 1.0 m, along with 15 cm high sheet obstruction at floor level along the railing.
- 4.9 Safe means of access shall be provided to all working platforms and other elevated working places. Every ladder shall be securely fixed. No single portable ladder shall be over 9 m in length. For ladders upto 3m in length the width between side rails in the ladder shall in no case be less than 300 mm. For longer ladders this width shall be increased by atleast 20 mm for each additional meter of length. Step spacing shall be uniform and shall not exceed 300 mm.
- 4.10 Adequate precautions shall be taken to prevent danger from electrical lines and equipment. No scaffolding, ladder, working platform, gangway runs, etc. shall exist within 3 meters of any uninsulated electric wire. Whenever electric power and lighting cables are required to run through (pass on) the scaffolding or electrical equipments are used, such scaffolding structures shall have minimum two earth connections with earth continuity conforming to IS Code of Practice.

5. EXCAVATION, TRENCHING AND EARTH REMOVAL

- 5.1 All trenches 1.2 m or more in depth shall at all times be supplied with at least one ladder for each spacing of 30 m in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least 1 m above the surface of the ground.
- 5.2 The sides of the trench which are 1.2 m or more in depth shall be stepped back to give suitable slope (angle of repose) or securely held by timber bracing, so as to avoid the danger of sides from collapsing. The excavated material shall not be placed within 1.5 m of the edges of the trench or half of the depth of the trench, whichever is more. Cutting shall be done from top to bottom. Under no circumstances mining or under-cutting shall be done.

- 5.3 The contractor shall ensure the stability and safety of the excavation, adjacent structures, services and the works.
- 5.4 Open excavations shall be fenced off by suitable railing and warning signals installed at night at well lit places so as to prevent slipping or falling into the excavations.
- 5.5 All blasting operations shall be carried out on the basis of procedures approved by Inspector of Explosives. All works in this connection shall be carried out as per IS Code of Practice. Barricades, Warning Signs etc. shall be placed on the roads/open area. Prior approval of such operation shall be obtained from Safety Engineer/Engineer-In-Charge of works.
- 5.6
- a) For removal of earth from an earth mound a written permission shall be obtained from the Engineer-In-Charge of the work and the Engineer-In-Charge of the earth mound.
 - b) As far as practical, earth shall be removed mechanically.
 - c) Wherever manual removal of earth is involved, earth shall be removed from the top by maintaining the proper slope equal to the angle of re-pose of the earth.
 - d) Such work shall be constantly supervised by the contractor's responsible person and frequently inspected by the departmental representative to ensure that no under-cutting is done.

6. CONCRETING

Shuttering and supporting structures shall be of adequate strength and approved by Engineer-In-Charge. This shall be ensured before concrete is poured. The procedure approved by Engineer-In-Charge shall be followed for mixing, transporting and pouring of concrete.

7. DEMOLITION

Before any demolition work is commenced and also during the progress of the work:

- (a) All roads and open area adjacent to the work site shall either be closed or suitably protected. Appropriate warning signs shall be displayed for cautioning approaching persons.
- (b) Before demolition operations begin, the Contractor shall ensure that the power on all electric service lines is shut off and the lines cut or disconnected at or outside the demolition site. If it is necessary to

maintain electric power during demolition operation, the required service lines shall be adequately protected against damage. Persons handling heavy materials/equipments shall wear safety shoes.

- (c) No floor, roof or other part of the building shall be overloaded with debris or materials as to render it unsafe.
- (d) Entries to the demolition area shall be restricted to authorized persons only.

8. PERSONAL PROTECTIVE EQUIPMENT

All necessary personal protective equipment as considered necessary by the Engineer-In-Charge shall be kept available by contractor for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also the Contractor shall take adequate steps to ensure proper use of equipment by those concerned. The personal protective equipments are to be provided by the contractor.

- (a) All persons employed at the construction site shall use safety helmets. For other types of works, persons working in that area shall also use safety helmets, if advised by Safety Engineer/Engineer-In-Charge.
- (b) Workers employed on mixing asphaltic materials, cement and lime mortars shall use protective goggles, protective foot wear and hand gloves. Use of proper respirators shall be an advantage.
- (c) Persons engaged in welding and gas cutting works shall use suitable welding face shields. The persons who assist the welders shall use suitable goggles. Protective goggles shall be worn while chipping and grinding.
- (d) Stone breakers shall use protective goggles. They shall be seated at sufficiently safe intervals of distance.
- (e) Persons engaged in or assisting in shot blasting operations and cleaning the blasting chamber shall use suitable gauntlets, overalls, dust-proof goggles, boots and protective hood supplied with fresh air at the minimum rate of 9 m³/hr.
- (f) All persons working at heights more than 4.5 m above ground or floor and exposed to risk of falling down shall use safety belts, unless otherwise protected by cages, guard railings, etc. In places where the use of safety belts is impractical, suitable net of

adequate strength fastened to substantial supports shall be employed.

- (g) All powered two-wheeler motorcycle and scooter drivers and their pillion riders shall wear crash helmets inside the Project/Plant sites.
- (h) When workers are employed in sewers and inside manholes which are in use, the Contractor shall ensure that the manholes are opened and are adequately ventilated at least for an hour. After it has been well-ventilated, the atmosphere inside the space shall be checked for the presence of any toxic gas or oxygen deficiency and recorded in the register before the workers are allowed to get into the manholes. The manholes opened shall be cordoned off with suitable railing and provided with warning signals or caution boards to prevent accidents. There shall be proper illumination in the night.

9. PAINTING

- 9.1 The Contractor shall not employ women on the work of painting with products containing lead in any form. Only men above the age of 18 years shall be employed on the work with lead paint. The following precautions shall be taken during the work.

- * Supplied air respirators shall be provided for use by the workers when paint is applied in the form of spray, or a surface having lead paint is dry rubbed or scraped.
- * Overalls shall be supplied by the Contractors to the workmen and adequate facilities shall be provided to enable the painters to wash at the cessation of work.
- * All painting jobs, especially those in which lead paints are used shall be kept under industrial hygiene surveillance.

- 9.2 Smoking, open flames or sources of ignition shall not be allowed in places where paints and other flammable substances are stored, mixed or used. A caution board, with the instructions written in national/regional language, "SMOKING – STRICTLY PROHIBITED" shall be displayed in the vicinity where painting is in progress or where paints are stored. Symbols shall also be used for caution boards.

Suitable fire extinguishers/sand buckets shall be kept available at places where flammable paints are stored, handled or used.

When painting work is done in a closed room or in a confined space, adequate ventilation shall be provided. If adequate ventilation cannot be provided, workers shall wear suitable respirators.

- 9.3 Epoxy resins and their formulations used for painting shall not be allowed to come in contact with the skin. The workers shall use plastic gloves and/or suitable barrier creams.

Adequate ventilation shall be provided especially when working with hot resin mixes.

Increased personal hygiene shall be practiced to control inadvertent contact with the resin and eliminate its effects.

Workers shall thoroughly wash hands and feet before leaving the work. Work clothes shall be changed and laundered frequently.

10. LIFTING MACHINES AND TACKLES

- 10.1 Use of lifting machines and tackles including their attachments, anchorage and supports shall conform to the following standards or conditions.

- (a) Lifting machines and tackles shall be of good mechanical construction, sound material and adequate strength and free from any defects and shall be kept in good repair and in good working order.

Every rope used in hoisting or lowering materials or as a means of suspension shall be of good quality and adequate strength and free from any defect.

- (b) Every crane operator or lifting appliance operator shall be properly qualified. No person under the age of 21 years shall be in charge of any hoisting machine or give signal to operator of such machines.

- (c) In case of every lifting machine (and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or as means of suspension) the safe working load shall be ascertained and clearly marked. In case of a lifting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing. This shall be approved by the Safety Engineer.

- (d) In case of departmental machines, the safe working load shall be notified by the Engineer-in-charge. As regards Contractor's machines, the Contractor shall notify the safe working load of the machine to the Engineer-in-charge whenever he brings any machinery to site of work and get it verified by the Engineer-in-charge, supported by a valid test certificate by the Competent Person.
 - (e) Thorough inspection and load testing of lifting machines and tackles shall be done by a competent person atleast once every 12 months and records of such inspection and testing shall be maintained.
- 10.2 Motors, gearing transmission, couplings, belts, chain drives and other moving parts of hoisting appliances shall be provided with adequate safeguards. Hoisting appliances shall be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced or lowered.
11. WELDING AND GAS CUTTING
- 11.1 Welding and gas cutting operations shall be done only by qualified and authorized persons and as per IS specifications and Code of Practice.
 - 11.2 Welding and gas cutting shall not be carried out in places where flammable or combustible materials are kept and where there is danger of explosion due to presence of gaseous mixtures.
 - 11.3 Welding and gas cutting equipment including hoses and cables shall be maintained in good condition.
 - 11.4 Barriers shall be erected to protect other persons from harmful rays from the work. When welding or gas cutting is done in elevated positions, precautions shall be taken to prevent sparks or hot metal falling on persons or flammable materials.
 - 11.5 Suitable type of protective clothing consisting of fire resistant gauntlet gloves, leggings, boots and aprons shall be provided to workers as protection from heat and hot metal splashes. Welding shields with filter glasses of appropriate shade shall be worn as face protection.
 - 11.6 Adequate ventilation shall be provided while welding in confined space or while brazing, cutting or welding zinc, brass, bronze, galvanized or lead coated materials.

- 11.7 Welding and gas cutting shall not be done on drums, barrels, tanks or other containers unless they have been emptied, cleaned thoroughly and it is made certain that no flammable material is present.
- 11.8 Fire extinguisher shall be available near the location of welding operations. Fire Safety Permit shall be obtained for working at vulnerable areas and operating areas before flame cutting/welding is taken up.
- 11.9 For electric (Arc) welding the following additional safety precautions shall be taken :
- i) When electrical welding is undertaken near pipe lines carrying flammables, such pipe lines shall not be used as part of earth conductor but a separate earth conductor shall be connected to the machine directly from the job.
 - ii) Personnel contact with the electrode or other live parts of electric welding equipment shall be avoided.
 - iii) Extreme caution shall be exercised to prevent accidental contact of electrodes with ground.
 - iv) The welding cables shall not be allowed to get entangled with power cables. It shall be ensured that the cables are not damaged by movement of materials.

12. GRINDING

- 12.1. All portable grinders shall be used only with their wheel guards in position to reduce the danger from flying fragments should the wheel break during the use.
- 12.2. Grinding wheels of specified diameter only shall be used on a grinder – portable or pedestal – in order not to exceed the prescribed peripheral speed.
- 12.3. Goggles shall be used during grinding operation.

13. ELECTRICITY

Guidelines for providing temporary power supply at the site and general safety procedures for using electricity are given in the enclosed Annexure.

14. HOUSE KEEPING

- 14.1 The Contractor shall at all times keep his work spot, site office and surroundings clean and tidy from rubbish, scrap, surplus materials and unwanted tools and equipment.
- 14.2 Welding and other electrical cables shall be so routed as to allow safe traffic by all concerned.
- 14.3 No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Engineer-in-charge may require the Contractor to remove any materials which are considered to be of danger or cause inconvenience to the public. If necessary, the Engineer-in-charge may cause them to be removed at the Contractor's cost.
- 14.4 At the completion of the work, the Contractor shall have removed from the work premises all scaffoldings, surplus materials, rubbish and all huts and sanitary arrangements used/installed for his workmen on the site.
- 14.5 The Engineer-in-charge has the right to stop work if the Contractor fails to improve upon the housekeeping after having been notified.

15. FIRE SAFETY

All necessary precautions shall be taken to prevent outbreak of fires at the construction site. Adequate provisions shall be made to extinguish fires should they still break out.

- (a) Quantities of combustible materials like timber, bamboos, coal, paints, etc., shall be the minimum required in order to avoid unnecessary accumulation of combustibles at site.
- (b) Containers of paints, thinners and allied materials shall be stored in a separate room which shall be well ventilated and free from excessive heat, sparks, flame or direct rays of the sun. The containers of paint shall be kept covered or properly fitted with lid and shall not be kept open except while using.
- (c) Fire extinguishers as approved by the Engineer-in-charge shall be located at the construction site at appropriate places.
- (d) Adequate number of Contract workmen shall be given education and training in fire fighting and extinguishing methods.

16. SAFETY WORK PERMIT

- 16.1 In order to ensure safety of work for hazardous operation (such as entry into confined spaces, welding/cutting on equipment/pipes where explosion hazards is present, works on high voltage and main medium voltage lines, blasting etc.) special Safety Work Permits (SWP) shall be raised. The SWP's shall also to be obtained for any other work as recommended by Safety Engineer.
- 16.2 The Contractor shall strictly ensure all the safety conditions and requirements stipulated in the Safety Work Permit. The decision of the Safety Engineer shall be final in this regard.

17. WORK IN RADIATION AREA

The Contractor shall follow the stipulated procedure regarding work in the radiation area and other works related with radiography.

18. WORK IN AND AROUND WATER BODIES

When the work is done near any place where there is risk of drowning, all necessary rescue equipment such as life buoys and life jackets shall be provided and kept ready for use and all necessary steps taken for prompt rescued of any person in danger and adequate provision shall be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work. Persons who do not know swimming shall not be engaged alone for any work where risk of drowning exists. Sufficient number of life buoys or life jackets shall be provided.

19. MEDICAL FACILITIES

- 19.1 The Contractor shall arrange adequate facilities for medical aid and treatment for his staff and workers engaged on the work site including the first-aid facilities if they are not available at the Project Site.
- 19.2 First-aid appliances including sterilized dressing, cotton wool and antiseptic cream shall be made available at a readily accessible places at every work site. These shall be maintained in good order under the charge of a responsible person.
- 19.3 At large work places where hospital facilities are not available within easy reach of the works, first-aid posts shall be established and be manned by a trained compounder. An ambulance shall be available during the entire period of work for attending to injury cases.

20. SAFETY OFFICER/SAFETY COORDINATOR

The Contractor shall have a Safety Officer or a supervisor to be designated as a Safety Coordinator in order to specifically look into the implementation of different safety requirements of the contract work. The person thus designated will in general co-ordinate with the Engineer-in-charge on matters of safety and in particular ensure that the Safety Guide is complied with fully. His name shall be displayed on the Notice Board at a prominent place at the work site.

21. REPORTING OF ACCIDENT

21.1 All accidents leading to property damage and/or personnel injuries shall be reported to the Engineer-in-charge immediately who shall inform SARCOP to be followed up with detailed accident reports in prescribed form.

21.2 Contractor shall also submit a monthly statement of accidents to Engineer-in-charge by 4th of every month showing details of accident, nature of injury including disability, days lost, treatment required etc., and the extent of property damage.

22. PUBLIC PROTECTION

The Contractor shall make all necessary provisions to protect the public. He shall be bound to bear the expenses for defence of every action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of any precaution required to be taken to protect the public. He shall pay any damage and cost which may be awarded in any such suit, action or proceedings to any such person, or the amount which may be fixed as a compromise by any such person.

23. OTHER STATUTORY PROVISIONS

Notwithstanding the above clauses from 1 to 21 there is nothing in these to exempt the Contractor from the provisions of any other Act or Rules in force in the Republic of India. In particular all operations involving the transport, handling, storage and use of explosives shall be as per the standing instructions and conform with the Indian Explosives Act, 1884 and The explosives Rules, 1983. Handling, transport, storage and use of compressed gas cylinders and pressure vessels shall conform with the Gas Cylinder Rules 1981 and Static and Mobile Pressure Vessels (Unfired) Rules 1981. In addition, The Indian Electricity Act 1910 and Indian Electricity Rules 1956, the Atomic Energy Act, 1962, the Radiation Protection Rules 1971, Radiation Protection Manual of Nuclear Facilities

and the Atomic Energy (Factories) Rules 1988 and various rules and Act related to mining shall also be strictly complied with.

ANNEXURE

GUIDELINES AND GENERAL PROCEDURES FOR SUPPLY AND USE OF ELECTRICITY AT SITE

1. GENERAL

Following safety requirements shall be complied with before the Contractor uses the power supply.

- 1.1 The Contractor shall submit a list of licensed electrical staff to be posted at site.
- 1.2 It shall be the responsibility of the Contractor to provide and maintain complete installation on the load side of the supply point with regard to the safety requirements at site. All cabling and installation shall comply with the appropriate statutory requirements given below and shall be subject to approval of the Departmental Engineer-in-charge/Electrical Engineer.
 - a) Indian Electricity Act, 1910
 - b) Electricity (Supply) Act, 1948
 - c) Indian Electricity Rules, 1956
 - d) National Electric Code 1985
 - e) Other relevant rules of Local Bodies and Electricity Boards.

After installation of the electrical power wiring works by the contractor, form of completion certificate as per IS 732 (Form SGCW-1) shall be submitted by the contractor duly signed by the authorized valid licensed electrical contractor and/or supervisor along with one copy of the contractor's license and/or competency certificate of supervisor issued by the Electricity Board/Government Electricity Organization as per the enclosure.

The power supply shall be regulated as per the terms and conditions of the supply of the respective electricity boards.

- 1.3 (a) For purposes of electrical load and power planning by the electrical section, the contractor shall furnish along with the tender, the estimated load requirement of electric power for the execution of the contract works in terms of maximum Kilo Watt or KVA demand during various periods/months of the contract period along with the details of the construction electrical equipment/machinery with their individual load details and location/locations of power supply

required for availing temporary electric power supply in the standard proforma enclosed (Form SGCW-2).

- (b) The electric power supply will be generally made available at one point in the works site of the contractor by the department.
 - (c) Where distribution boards are located at different places the Contractor shall submit schematic drawing indicating all details like size of wires, Over Head or cable feeders, earthing etc. The position and location of all equipment and switches shall be given.
- 1.4 The Contractor shall make his own arrangements for main earth electrode and tapplings thereof. The existing earth points available at site can be used at the discretion of the Departmental Electrical Engineer with prior permission. Method of earthing, installation and earth testing results shall conform to relevant I.S. Specifications (IS-3043)
 - 1.5 All three phase equipment shall be provided with double earthing. All light fixtures and portable equipment shall be effectively earthed to main earthing.
 - 1.6 All earth terminals shall be visible. No gas pipes and water pipes shall be used for earth connection. Neutral conductor shall not be treated as earth wire.
 - 1.7 The Contractor shall not connect any additional load without prior permission of Departmental Electrical Engineer. For obtaining additional power required, test reports of the tests mentioned in (d) of Form SGCW-1 shall be submitted.
 - 1.8 Joints in earthing conductors shall be avoided. Loop earthing of equipment shall not be allowed. However, tapplings from an earth bus may be done.
 - 1.9 The entire installation shall be subjected to the following tests before energisation installation including portable equipment :
 - a) Insulation resistance test
 - b) Polarity test of switches
 - c) Earth continuity test
 - d) Earth electrode resistance

The test procedures and their results shall conform to relevant IS Specifications. The Contractor shall submit a test report for his complete installation every 2 months or after rectifying any faulty section in the specimen test report. One such test report for the complete installation shall be submitted before onset of monsoon.

2. The following are provided for general guidance of the Contractor and shall be read as specific requirement, in addition to complying with Indian Electricity Act, Indian Electricity Rules and IS Specifications.

2.1 Installation

- a) Only persons having valid wireman's license/competency certificate shall be employed for carrying out electrical work and repair of electrical equipment, installation and maintenance at site. The job shall be supervised by a qualified licensed Supervisor.
- b) Electrical equipment and installations shall be installed and maintained as to prevent danger from contact with live conductors and to prevent fires originating from electrical causes like short circuits, overheating etc. Installation shall not cause any hindrance to movement of men and materials.
- c) Materials for all electrical equipment shall be selected with regard to working voltage, load and working environment. Such equipment shall conform to the relevant standards.
- d) The minimum clearance to be maintained for all overhead lines along roads and across roads shall be as per the statutory requirements as listed in clause 1.2 of Annexure.
- e) Grounding conductor of wiring system shall be of copper or other corrosion-resistant material. An extra grounding connection shall be made in appliances/equipment where chances of electric shock is high.
- f) Electric fuses and/or circuit breakers installed in equipment circuits for short circuit protection shall be of proper rating. It is also recommended that high rupturing capacity (HRC) fuses be used in all circuits. For load of 5 KW or more earth leakage circuit breaker shall be provided in the circuits.
- g) Wherever cables or wires are laid on poles, a guard wire of adequate size shall be run along the cables/wires and earthed effectively. Metallic poles as a general rule, shall be avoided and if used shall be earthed individually. Anticlimbing guards and danger

notices shall be provided on poles. Each equipment shall have individual isolating switches.

- h) Wires and cables shall be properly supported and an approved method of fixing shall be adopted. Loose hanging of wires & cables shall be avoided. Lighting and power circuits shall be kept distinct and separate.
- i) Reinforcement rods or any metallic part of structure shall not be used for supporting wires and cables, fixtures, equipment, earthing etc.
- j) All cables and wires shall be adequately protected mechanically against damages. In case the cable is required to be laid under ground, it shall be adequately protected by covering the same with bricks, Plain Cement Concrete (PCC) tile or any other approved means.
- k) All armoured cables shall be properly terminated by using suitable cable glands. Multistranded conductor cables shall be connected by using cable lugs/sockets. Cable lugs shall preferably be crimped. They shall be of proper size and shall correspond to the current rating and size of the cable. Twisted connections will not be allowed.
- l) All cable glands, armouring and sheathing of electric cables, metal circuits and their fittings, metallic fittings and other non-current carrying parts of electrical equipment and apparatus shall be effectively grounded.
- m) All the Distribution Boars, Switch Fuse units, Bus bar chambers, ducts, cubicles etc. shall have MS enclosures and shall be dust, vermin and water proof. The Distribution Boards, switches etc. shall be so fixed that they shall be easily accessible. Changes shall be done only after the approval of the Departmental Electrical Engineer.
- n) The Contractor shall provide proper enclosures/covers of approved size and shape for protection of all the switch board, equipment etc. against rain. Exposed live parts of all electrical circuits & equipment shall be enclosed permanently. Crane trolley wires and other conductors which cannot be completely insulated shall be placed such that they are inaccessible under normal working conditions.

- o) Iron clad industrial type plug outlets are preferred for additional safety.
- p) Open type Distribution Boards shall be placed only in dry and ventilated rooms; they shall not be placed in the vicinity of storage batteries or otherwise exposed to chemical fumes.
- q) Isolating switches shall be provided close to equipment for easy disconnection of electrical equipment or conductors from the source of supply when repair or maintenance work has to be done on them.
- r) In front of distribution boards a clear space of 90 cm shall be maintained in order to have easy access during an emergency.
- s) Adequate working space shall be provided around electrical equipment which require adjustment or examination during operation.
- t) As far as possible electrical switches shall be excluded from a place where there is danger of explosion. All electrical equipment such as motors, switches and lighting fittings installed in work room where there is possibility of explosion hazards shall be explosion proof.
- u) All connections to lighting fixtures, starters or other power supplies shall be provided with PVC insulated, PVC sheathed twin/three/four core wires to have better mechanical protection for preventing possible damage to equipment or injury to personnel. Taped joints shall not be allowed and the connections may be made in looping system. Electric starter of motors, Switches shall not be mounted on wooden boards. Only sheet steel mounting or iron frame work shall be used.
- v) All the lighting fixtures and lamp holders shall be of good quality and in good condition. Badly repaired or broken holders, etc. shall not be used.
- w) Only PVC insulated and PVC sheathed wires or armoured PVC insulated and sheathed cables shall be used for external power supply connections of temporary nature. Weather proof rubber wires shall not be used for any temporary power supply connections. Taped joints in the wires shall not be used.
- x) The bulbs/lamps used for illumination and testing purpose shall have cover or guard to protect them from accidental breakages.

Only 24 V supply system shall be used for hand lamps etc. while working inside metallic tanks or conducting vessels.

- y) After installation of new electric system and or other extensive alterations to existing installations, thorough inspection shall be made by Departmental Electrical Engineer before the new system or new extension is put in use.
- z) Contractor shall ensure that power factor for their loads shall be maintained at 0.85. In case the power factor falls below 0.85, necessary capacitor units shall be provided by the contractor.

2.2 Operation & Maintenance

- a) All persons who work with electrical installation/equipment shall be aware of the electrical hazards, use of protective devices and safe operational procedures. They shall be given training in fire fighting, first aid and artificial resuscitation techniques.
- b) The supervisor shall instruct the workers in the proper procedure, specify and enforce the use of necessary protective equipment such as adequately insulated pliers, screw drivers, fuse pullers, testing lamps and similar hand tools. Only wooden ladders shall be used to reach the heights in electrical work.
- c) No material or earth work shall be allowed to be dumped below or in the vicinity of the bare overhead line conductors.
- d) Separate work permits shall be issued for individual group leaders working on the same system which shall be returned after the completion of the work to Safety Supervisor and no system shall be energized without the clearance of Safety Supervisor.
- e) Before any maintenance work is commenced on electrical installations/equipment, the circuits shall be de-energized and ascertained to be dead by positive test with an approved voltage testing device. Switches shall be tagged or the fuse holders withdrawn before starting the work. Adequate precautions shall be taken in two important aspects viz.
 - i) That there shall be no danger from any adjacent live parts and
 - ii) That there shall be no chances of re-energisation of the equipments on which the persons are working.

- f) While working on or near a circuit, whenever possible the use of one hand may be practiced even though the circuit is supposed to be dead. The other hand may preferably be kept in pocket.
- g) When it is necessary to touch electrical equipment (for example when checking for overload of motors) back of the hand may be used. Thus, if accidental shock were to cause muscular contractions, one would not 'freeze' to the conductor.
- h) Operation of electrical equipment shall be avoided when standing on wet floor or when hands are wet.
- i) Before blown fuses are replaced, the circuit shall be locked out and an investigation shall be made for the cause of the short circuit or overload.
- j) When two persons are working within reach of each other, they shall never work on different phases of the supply.
- k) When structural repairs, modification or painting work are to be undertaken, appropriate measures shall be taken for the protection of persons whose work may bring them into the proximity of live equipment/circuit.
- l) It shall be ensured that the insulation and wire size of extension cords are adequate for the voltage and current to be carried.
- m) While tapping electricity from the socket, plug top must be used. It shall be ensured that no extension boards are over loaded while tapping. Only standard three pin plugs shall be used for tapping electricity. Broken sockets/plugs shall be replaced immediately with goods ones. Only joint free cables shall be used for connecting equipment/apparatus.
- n) Floors shall be kept free from trailing electrical cables to avoid tripping hazard.
- o) Power supply to all the machines and lighting fixture, shall be switched off when not in use.
- p) Temporary electrical connections shall be removed as soon as the stipulated work is over. After completion of the works, the Contractor shall dismantle the distribution boards and the other facilities he may have erected.

- q) Unauthorized tapping of power by others from distribution boards under the control of the contractor shall be prohibited at all circumstances.
- r) No flammable materials shall be stored in any working area near the switch boards.
- s) Safety work permits shall be used for switching off the main feeder and equipment by the contractor.
- t) "MEN ON LINE" "DO NOT SWITCH ON" "DANGER" or "CAUTION" board as applicable shall be used during maintenance works on the electrical equipment.

2.3 Portable electrical equipment

- a) Portable electrical equipment shall be regularly examined, tested and maintained to ensure that the equipment and its leads are in good order. Register shall be maintained for inspection recording the testing dates and results of the equipments.
- b) All portable appliances shall be provided with three core cable and three pin plug. The third pin of the plug shall invariably be earthed. It shall be ensured that the metal part of the equipment shall be effectively earthed.
- c) All connections to portable equipment or machines from the panel/distribution board/extension board shall be taken using 3 core double insulated PVC flexible copper wire in one length. No joints shall be allowed in this flexible wire. In case single length of wire is not sufficient for a particular location then the supply can be tapped by providing another extension board comprising of switch and socket.
- d) Flexible cables for portable lamps, tools, and apparatus shall be regularly examined, tested periodically and maintained to ensure safety.

FORM NO. SGCW – 1

FORM FOR COMPLETION CERTIFICATE

(Prescribed under cl. 1.2 of Annexure)

I/We certify that the installation detailed below has been installed by me/us and tested and that to the best of my/our knowledge and belief, it complies with Indian Electricity Rules, 1956 as well as IS:732-1963 code of practice for Electrical Wiring Installations. (System voltage not exceeding 650 Volts (Revised).

Electric installation at

Voltage and system of supply

a)	Particulars of work	Number -----	Total load -----	Type of system of wiring -----
	i) Light Points			
	ii) Fan points			
	iii) Plug points (3 pin)			
	iv) Motors			

b) If the work involves installation of overhead lines and/or underground cable _____

c) Earthing:

Description of earthing electrode, size of earth wire and number of electrodes provided:

d) Test results:

1. Insulation resistance for the whole installation:

- i) Between conductors
- ii) Between each conductor and earth

2. Resistance of earthing electrode or earthing system.

3. Maximum earthing resistance of installation

Signature of Supervisor
Name and address
of Supervisor.

Signature of Contractor
Name and address
of Contractor.

FORM NO. SGCW – 2

‘A’ APPLICATION FOR SERVICE CONNECTION BY CONTRACTOR

(Prescribed under cl. 1.3 of Annexure)

(to be filled in triplicate)

1. Name & Address of Contractor :
2. Reference to Tender & Work Order :
3. Completion period :
4. Connected load details (please attach details in a separate sheet) :
5. Max. demand anticipated :
6. Nature of service connection required (whether single or three phase) :
7. Place where service required :
 - a) Works :
 - b) Colony :
8. If supply of electricity is free or chargeable (please enclose extract of conditions from the tender) :
9. Details of meter provided :
 - a) If meter required from the Department, whether SD is paid :
 - b) Details of SD (Security Deposit) :
 - c) Whether meter is tested or not, if tested, attach test report, if not, details of testing fee deposited :
10. Name of Supervisor/Electrician in charge of installation and maintenance :
11. Electrical license No. of person mentioned against col. 10 :

12. Electrical safety appliances available :
for use

13. Fire extinguishers available for use :

14. First Aid facility/box available for use, if any. :

(Signature of the Contractor)

Date:

Name:

'B' CERTIFICATE BY THE CONTRACTOR

Certified that my/our installations have been carried out in accordance with I.E. Rules and that I/We have employed competent persons to handle the installations.

I/we am/are agreeable to the bills, in respect of this service connections being raised on the basis the connected load furnished above, in case the actual consumption falls below the one stipulated by the tender conditions.

(Signature of the Contractor)

Name :

Address:

Date :

.....

'C' CERTIFICATE BY THE CONTRACT CONTROL ENGINEER

Verified the particulars and forwarded to the Engineer-in-charge.

(Signature of Contract control Engineer)

Name:

Section: Civil/Electrical/Mechanical.

.....

'D' CERTIFICATE BY THE ENGINEER IN CHARGE

Certified that the particulars furnished by the Contractor are true to the best of my knowledge and belief and that I have satisfied myself as to the safe conditions of electrical installations for which the service connection is applied for.

Signature :

Name:

Date:

Designation with section:

'E' CERTIFICATE BY THE SAFETY ENGINEER

Certified that I have inspected the electrical installations referred herein and after satisfying myself about the safe conditions of the installation, I hereby recommend that the service connection be given to the Contractor.

Signature of Safety Engineer.

Name:

Date:

.....

'F' AUTHORIZATION BY THE ELECTRICAL ENGINEER

Service connection may be/may not be given for the reasons noted hereunder.

Signature of Electrical Engineer.

Name:

Date:

Designation:

‘G’ “REPORT OF COMPLIANCE”

Service connection is given by me on

a)	Meter Nos.	1.
		2.
		3.
b)	Initial readings:	1.
		2.
		3.
c)	Locations:	1.
		2.
		3.
d)	Meter sealings	

Signature of Electrical Engineer
(Metering and Billing)

Name:

Date:

Designation:

Note:

1 st copy to Contract Control Engineer	)	After all the formalities are completed and Report of Compliance in (G) are filled up by the Electrical Engineer after power supply is given.
2 nd copy to Safety Engineer	)	
	)	
and 3 rd copy to Electrical Engineer	)	

ANNEXURE-1

IMPORTANT RULES OF ATOMIC ENERGY (FACTORIES) RULES, 1996 APPLICABLE TO ENGINEERING, PROCUREMENT & CONSTRUCTION CONTRACTS

CHAPTER III

HEALTH

8. RECORD OF WHITEWASHING, ETC.- The record of dates on which whitewashing, colourwashing, varnishing, etc. are carried out shall be entered in a register maintained in a manner specified in Form 2.

9. CLEANLINESS OF WALLS, CEILINGS AND COMPOUND AREA.-

(1) Clause (d) of sub-section (1) of section 11 of the Act shall not apply to the class or description of factories or parts of factories specified in the Table to this rule and subject to the condition that they are kept in a clean state by washing, sweeping, brushing, dusting, vacuum cleaning or other effective and adequate means:

Provided the said clause shall continue to apply-

- (a) as respects units/factories or parts of units/factories specified in part A of the said Table, to workrooms in which the amount of cubic space allowed for every person employed in the room is less than 14.0 m^3
 - (b) as respects factories or parts of factories specified in part B of the said Table, to workrooms in which the amount of cubic space allowed for every person employed in the room is less than 70.0 m^3 ;
 - (c) to engine-houses, fitting shops, lunchrooms, canteens, shelters, creches, cloakrooms, rest-rooms and wash places; and
 - (d) to such parts of walls, sides and tops of passages and staircases as are less than 6 m. above the floor or stair.
- (2) If it appears to the Competent Authority that any part of a factory, to which by virtue of sub-rule (1) any of the provisions of the said clause (d) do not apply or apply as modified by sub-rule (1), is not being kept in a clean state, it may, by written notice, require the occupier to whitewash or colourwash, wash, paint or varnish the same, and in the event of the occupier failing to comply with such requisition within two months from the date of the notice, sub-rule (1) shall cease to apply to such part of a factory, unless the Competent Authority otherwise determines.

Rules 9-11

- (3) The compound surrounding every factory shall be maintained in a sanitary and clean condition free of rubbish, filth or debris.

TABLE**Part A**

1. Chemical works.
2. The following parts of units/factories:-
 - (a) Rooms used only for storage of articles.
 - (b) Rooms in which the walls or ceilings consist of galvanised iron and/or asbestos cement sheets.
 - (c) Rooms in which graphite articles are manufactured / processed
 - (d) Parts of walls, partitions, ceilings or tops of rooms which are at least 6 m. above the floor.

Part B

1. Electric generating or transforming stations.
 2. Engineering works.
 3. Foundries other than foundries in which brass casting is carried on.
- 10. DISPOSAL OF WASTES AND EFFLUENTS.-** The arrangements made in every factory after the treatment of wastes and effluents due to the manufacturing processes carried on therein shall be in accordance with those approved by the relevant Water and Air pollution Boards appointed under Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environmental Protection Act, 1986 and such other authorities as may be notified by the Central Government in this behalf.
- 11. ILLUMINATION, TEMPERATURE AND VENTILATION.-**
- (1) Illumination.-
 - (a) General : Adequate lighting is necessary for all buildings and in the open area so as to-
 - (i) promote work and other activities carried out in the area;
 - (ii) promote safety of the people; and
 - (iii) create a pleasing environment conducive for feeling of well-being.
 - (b) Adequate lighting will be achieved by,-

Rules 11-11(Tab.)

- (i) planning of brightness in relation to task itself, immediate background of the task and the general surrounding;
 - (ii) avoiding glare produced by excessive contrast or abrupt and large change in brightness; and
 - (iii) planning of lighting for movement about a building and around.
- (c) The recommended values of illumination for different locations is given in the Table below:

TABLE

Sr.No.	Visual Tasks	Illumination (Lux)
1.	Industrial Buildings & Process	
(a)	General Factory Areas	100-150
	-canteens, cloakrooms, entrances	
	corridors, stairs	
(b)	Factory- outside Areas	
	-Stockyards, main entrances	20
(c)	Assembly, Inspection, Wood working, Welding & Soldering, Machine & Fitting Shops,	
(i)	Rough Work - Frame assembly	150
(ii)	Medium Work - Assembly of parts	300
(iii)	Fine Work - Electronic assembly, inspection	700
(iv)	Very Fine Work - Assembly of precision parts, optical aids to be provided.	1500
(v)	Very Precise Work	3000
(d)	Boiler Houses	
(i)	Coal & ash handling	100
(ii)	Boiler rooms-operating area	100
(iii)	Boiler rooms- other areas	20-50
(iv)	Outdoor plants	150

Rule 11(Tab.)

(e)	Chemical Works	
(i)	Hand furnace, boiling tanks, driers, evaporators etc.	150
(ii)	Controls, gauges, valves etc. (Supplementary lighting for viewing)	100
(iii)	Control rooms	200-300
(f)	Electricity Generating Station (indoor)	
(i)	Turbine halls	200
(ii)	Auxiliary equipment areas	100
(iii)	Boiler houses	70-100
(iv)	Boiler house & Turbine house	100
(v)	Basement areas	70
(vi)	Conveyer areas	70-100
(vii)	Control rooms	200-300
(viii)	Nuclear reactors & steam generating plants	150-200
(g)	Engraving	1000
(h)	Foundries	
(i)	Charging floors, tumbling etc.	150
(ii)	Fine moulding, core making & inspection	300
(iii)	Repairs	300
(i)	Garages	
(i)	Parking areas	70
(ii)	Washing, polishing etc.	150
(iii)	Repairs	300
(j)	Gauge & Tool room (Supplementary lighting if required)	700

Rule 11(Tab.)

(k)	Laboratories & Test Rooms	
	(i) General Labs & balance rooms	300
	(ii) Electronic & Instrument Labs	450
(l)	Laundries, Dry cleaning & ironing	200-300
(m)	Paint Shops & Spraying Booths	
	(i) Dipping, rubbing	150-300
	(ii) Fine painting & retouching	450-700
(n)	Plating Shops	
	(i) Vat & baths	150
	(ii) Final buffing & polishing	Special lighting
(o)	Structural Steel Fabrication Plants	
	(i) General	150
	(ii) Marking off	300
(p)	Libraries	
	(i) Shelves	70-150
	(ii) Reading rooms	150-700
	(iii) Cataloguing, sorting	150-300
	(iv) Book binding etc.	300-700
(q)	Offices	
	(i) Entrance & Reception	150
	(ii) Conference rooms & Gen. office	30
	(iii) Drawing offices	300-450
	(iv) Corridors & Lifts	70
	(v) Stairs, Lift landing	100-150
	(vi) Telephone exchanges	150-200

Rule 11(Tab.)

(r)	Hospitals	
(i)	General & Wards	150
(ii)	Operating Theatres General	300
(iii)	Operation table	Special lighting
(iv)	Laboratories	300
(v)	Radiological rooms	100
(vi)	Other areas	100-300
(s)	Restaurants	
(i)	Dining room tables	100
(ii)	Self service counters	300
(iii)	Kitchen	200
(iv)	Cloak room & toilets	100

- (2) **Temperature.-** It is essential to provide such temperature in work environment so that workers can be exposed to it repeatedly without adverse health effects. The nature of work can be light , moderate or heavy and the corresponding heat loads for the type of work are 200, 200-350 & 350-500 K Cal/hr. The heat stress is measured in terms of Wet Bulb Globe Temperature (WBGT) Index.* (* Note - on page 12)

The permissible WBGT index in degrees Celsius is given in the following WBGT Table.

WBGT TABLE

Work-Rest Regimen in each hour	Work Load		
	Light	Moderate	Heavy
Continuous Work	30.0	26.7	25.0
75% Work - 25% Rest	30.6	28.0	25.9
50% Work - 50% Rest	31.4	29.4	27.9
25% Work - 75% Rest	32.2	31.1	30.0

The Competent Authority shall specify the optimum working temperature & humidity and also the rest periods for specific factories & jobs.

Rule 11(Tab.)

- (3) Ventilation.- Ventilation shall be provided in buildings to supply fresh air for respiration & to dilute inside air to prevent vitiation by body odours & to remove any other products of combustion or other air contaminants. Contaminants from concentrated sources such as smoke, heat & fumes shall be collected separately by local exhaust ventilation. The recommended air changes per hour for various areas is given in the Table below:

TABLE

Area	Air Changes/hour
Factories	3 - 6
Dining Hall	12 - 15
Garages	12 - 15
Kitchen	6 - 9
Laboratories	3 - 6
Offices	3 - 6
Bathrooms & Toilets	6 - 12

Provided that the competent authority may relax the requirements regarding the number of air changes if it is satisfied that having regard to the location of the factory, orientation of the workroom, prevailing winds, roof height and the nature of manufacturing process carried on, sufficient supply of fresh air into the workroom is afforded during most part of the working time:

Provided further that in the regions where in summer (15th March-15th July) dry-bulb temperatures of outside air in the shade during most part of the day exceed 35 degrees Celsius and simultaneous wet-bulb temperatures are 25 degrees Celsius or below and in the opinion of the Inspector the manufacturing process carried on in the workroom of a factory permits thermal environments with relative humidity of 50% or more, the Inspector may serve on the manager of the factory an order to have sufficient supply of outside air for ventilation cooled by

* (a) Outdoors with Solar load

$$WBGT = 0.7NWB + 0.2GT + 0.1DB$$

Where NWB = Natural Wet Bulb Temperature

DB = Dry Bulb Temperature

GT = Globe Thermometer Temperature

(b) Indoor or Outdoor without Solar load

$$WBGT = 0.7 NWB + 0.3GT$$

Rules 11(Tab.)-16

passing it through water sprays either by means of unit type of evaporative air coolers(desert coolers) or, where supply of outside air is provided by mechanical means through ducts in a plenum system, by means of central air washing plants.

12. QUANTITY OF DRINKING WATER.- The quantity of drinking water to be provided per day for the workers in every factory shall be at least 5 litres per worker employed in the factory and such drinking water shall be readily available at all times during working hours.

13. SOURCE OF SUPPLY.- The water provided for drinking shall be supplied,-

- (a) from the public water supply system, or
- (b) from any other source approved in writing by the local Health Officer concerned.

14. MEANS OF SUPPLY.- If drinking water is not supplied directly from taps either connected with public water supply system or any other water supply system of the factory approved by the local Health Officer concerned, it shall be kept in suitable vessels, receptacles or tanks fitted with taps and having dust proof covers, and placed on raised stands or platforms in shade and having suitable arrangement of drainage to carry away the spilt water. Such vessels, receptacles or tanks shall be kept clean and the water renewed at least once every day. All practicable measures shall be taken to ensure that the water is free from contamination.

15. CLEANLINESS OF WELL OR RESERVOIR.-

- (1) Drinking water shall not be supplied from any open well or reservoir unless it is so constructed, situated, protected and maintained as to be free from the possibility of pollution by chemical, or bacterial and extraneous impurities.
- (2) Where drinking water is supplied from such a well or reservoir, the water in it shall be sterilised once a week or more frequently if the inspector by written order so requires, and the date on which sterilising is carried out shall be recorded:

Provided that this requirement shall not apply to any such well or reservoir if the water therein is filtered and treated to the satisfaction of the local Health Officer concerned before it is supplied for consumption.

16. REPORT FROM LOCAL HEALTH OFFICER CONCERNED.- The Inspector may by order in writing direct the manager to obtain, at such time or at such intervals as he may direct, a report from the local Health Officer concerned as to the fitness for human

Rules 16-18

consumption of the water supplied to the workers, and to submit to the Inspector a copy of such report as soon as it is received from the local Health Officer.

17. COOLING OF WATER.- In every factory wherein more than two hundred and fifty workers are ordinarily employed,-

- (1) The drinking water supplied to the workers shall be cooled by an effective method for the period specified by the Inspector;
- (2) The cool drinking water shall be supplied in every canteen, lunchroom and rest-room and also at conveniently situated points throughout the factory which for the purpose of the rules shall be called "water centres";
- (3) The water centres shall be sheltered from the weather and adequately drained and shall be located outside the work-places where toxic materials are handled or processed;
- (4) The number of water centres to be provided shall be one "centre" for every 150 persons employed at any one time in the factory:

Provided that in the case of a factory where the number of persons employed exceeds 500 it shall be sufficient if there is one such "centre" as aforesaid for every 150 persons up to the first 500 and one for every 500 persons thereafter:

Provided further that its distance between the place of work shall be such as may be specified by the Inspector.

- (5) Every water centre shall be maintained in a clean and orderly condition; and
- (6) The means of supply of cooled drinking water shall be either directly through taps connected to water coolers or any other system for cooling of water, or by means of vessels, receptacles or tanks fitted with taps and having dust proof covers and placed on raised stands or platforms in shade, and having suitable arrangement of drainage to carry away the spilt water. Such vessels, receptacles or tanks shall be kept clean and the water refilled at least once every day.

18. LATRINE ACCOMMODATION.- Latrine accommodation shall be provided in every factory 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;

Rules 18-24

Provided that where the number of males exceeds 100, it shall be sufficient if there is one latrine for every 25 males up to the first 100 males, and one for every 50 males thereafter.

Note:- In calculating the number of latrines required under this rule, any odd number of workers less than 25, or 50 as the case may be, shall be reckoned as 25 or 50.

19. **TOILET BLOCKS .-** The toilet block shall consist of wash basins, latrines and urinals (in case of male workers). The number of wash basins will be the same as number of latrines. Each wash basin shall be provided with mirror and liquid/cake soap. Each toilet block shall be provided with clean towel or electric hand drier. The number, size and location of the toilet block shall be as per the decision of Inspector & Public Health Authority.
20. **PRIVACY OF TOILET.-** Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings, which shall be maintained in good working order at all time.
21. **SIGN BOARDS TO BE DISPLAYED.-** Where workers of both sexes are employed, there shall be displayed outside each latrine block a notice "For Men Only" or "For Women Only" as the case may be, in the language understood by the majority of the workers. The notice shall also bear the figures of a man or of a woman as the case may be.
22. **URINAL ACCOMMODATION.-** Urinal accommodation shall be provided for the use of male workers and there shall be at least one urinal for every 50 males:

Provided that where the number of males employed exceeds 500, it shall be sufficient if there is one urinal for every 50 males up to the first 500 employed, and one for every 100 thereafter.

Note:- In calculating the urinal accommodation required under this rule any odd number of workers less than 50, or 100, as the case may be, shall be reckoned as 50 or 100.
23. **URINALS TO CONFORM TO PUBLIC HEALTH REQUIREMENTS.-** Urinals other than those connected with an efficient water-borne sewage system, and urinals in a factory wherein more than two hundred and fifty workers are ordinarily employed shall comply with the requirements of the Public Health Authorities.
24. **CERTAIN LATRINES AND URINALS TO BE CONNECTED TO SEWERAGE SYSTEM.-** When any general system of underground sewerage with an assured water supply for any particular locality is provided in a municipality, all latrines and urinals of a factory situated in

Rules 24-29

such locality shall, if the factory is situated within 30 metres of an existing sewer, be connected with that sewerage system suitably.

- 25. WHITEWASHING, COLOURWASHING OF LATRINES AND URINALS.-** The walls, ceilings and partitions of every latrine and urinal shall be whitewashed or colourwashed and the whitewashing or colourwashing shall be repeated at least once in a period of four months. The dates on which the whitewashing or colourwashing is carried out shall be entered in the prescribed register (Form 2):

Provided that this rule shall not apply to latrines and urinals, the walls, ceilings or partitions of which are laid in glazed tiles or otherwise finished to provide a smooth, polished, impervious surface and that they are washed with suitable detergents and disinfectants at least once in every period of four months.

- 26. CONSTRUCTION AND MAINTENANCE OF DRAINS.-** All drains carrying waste or sullage water shall be constructed in masonry or other impermeable material and shall be regularly flushed and the effluent disposed of by connecting such drains with a suitable drainage line:

Provided that where there is no such drainage line, the effluent shall be deodorized and rendered innocuous and then disposed of in a manner suitable to the satisfaction of the local Health Officer concerned.

- 27. WATER TAPS IN LATRINES.-** Where piped water supply is available, a sufficient number of water taps, conveniently accessible, shall be provided in or near latrine accommodation. A tap per each latrine is to be preferred. There shall be at least one tap for every ten latrines or part thereof. The water taps shall be connected to the Municipal water supply or to an overhead storage tank of sufficient capacity, so that water is available from the taps during all hours when the workers are in the factory. Wherever commode type of latrines are provided arrangements shall be made for providing toilet paper and soap solution, in addition to the water tap. The toilet paper and soap solution shall be regularly replenished.

- 28. NUMBER AND LOCATION OF SPITTOONS.-** The number and location of the spittoons to be provided shall be to the satisfaction of the Inspector. Such spittoons shall be placed on a stand or a bracket 90 cm. high.

- 29. TYPE OF SPITTOONS.-** The spittoons shall be of either of the following types, namely:-

- (a) a galvanized iron container with a conical funnel-shaped cover. A layer of suitable disinfectant liquid shall always be

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maintained in the container; or

- (b) a container filled with dry clean sand, and covered with a layer of bleaching powder; or
- (c) any other type approved by the Competent Authority.

30. CLEANING OF LATRINES, URINALS, WORKPLACES & SPITTOONS.-

Latrines, urinals, washplaces & spittoons shall be maintained in clean & sanitary conditions by employing adequate number of sanitary staff.

31. Qualifications of competent person with reference to various Sections of the Act are given in the schedule below.**SCHEDULE**

The Competent Person is a person who is having a degree in the discipline mentioned or equivalent followed by experience as specified, in responsible position in the field and designated by the Competent Authority.

Sl. No.	Rules made under section of the Act requiring competency	Type of work	Discipline	Experience
1	2	3	4	5
1.	Section(6)	Civil construction structural work.	Civil or structural engineering	& Minimum 10 yrs in design, construction testing or repairs of structures, knowledge of various codes pertaining to the non destructive testing methods.
2.	Section21(2)	Operation of dangerous machines	Electrical mechanical engineering equivalent	or Minimum 7 yrs in design, operation or maintenance, testing of relevant machinery, guards, safety devices etc.
3.	Section 28	Lifts & Hoists	- do -	Min. 7 yrs. in design, erection maintenance, inspection and test procedures of Hoists & lifts.

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1	2	3	4	5
4.	Section 29	Lifting Machinery Lifting tackles	Electrical, Mechanical Metallurgical	Min.7 yrs. in design, erection maintenance, inspection. testing of lifting machinery or lifting tackle
5.	Section 31	Pressure plant	Chemical, Electrical mechanical metallurgical Engineering equivalent	Min. 10 yrs experience in design, erection, maintenance, testing examination, inspection of pressure plants and knowledge of non destructive testing & codes of safety requirement of pressure vessels.
6.	Section 36	Dangerous fumes	Chemical engineering or masters degree in chemistry	Min.7 yrs. experience in collection and analysis of environmental samples and calibration of monitoring equipment.
7.	Section 41-C (b)	Supervision of handling of hazardous substances	Chemical engineering or masters degree in chemistry	Min. 7 yrs. experience on the shop floor in handling & disposal of hazardous chemicals.
8.	Section 87	Ventilation system	Electrical or mechanical engg.	Min.7 yrs. in design, fabrication, installation, testing of ventilation systems and systems used for collection of dusts, fumes etc.

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CHAPTER IV

SAFETY

- 32. Without prejudice to the provisions of sub-section (1) of section 21 of the Act in regard to fencing , the further precautions specified in Schedules annexed here to shall apply to machines mentioned in each Schedule.**

SCHEDULE I

WOODWORKING MACHINERY

1. Definitions.-For the purposes of this schedule -
 - (a) "woodworking machine" means a circular saw, band saw, planing machine, chain mortising machine or vertical spindle moulding machine operating on wood or cork;
 - (b) "circular saw" means a circular saw working in a bench (including a rack bench), but does not include a pendulum or similar saw which is moved towards the wood for the purpose of cutting operation;
 - (c) "band saw" means a band saw, the cutting portion of which runs in a vertical direction but does not include a log saw or band re-sawing machine; and
 - (d) "planing machine" means a machine for overhead planing or for thicknessing or for both operations.
2. Stopping and starting device.- An efficient stopping and starting device shall be provided on every woodworking machine. The control of this device shall be in such a position as to be readily and conveniently operated by the person in charge of the machine.
3. Space around machines.- The space surrounding every woodworking machine in motion shall be kept free from obstruction.
4. Floors.-The floor surrounding every woodworking machine shall be maintained in good and smooth condition, and shall not be allowed to become slippery, and as far as practicable shall be kept free from chips or other loosely scattered material.
5. Training and supervision.-
 - (a) No person shall be employed at a woodworking machine unless he has been sufficiently trained to work that class of machine, or unless he works under the adequate supervision of a person who has a thorough knowledge of the working of the machine.

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- (b) A person who is being trained to work a woodworking machine shall be fully and carefully instructed as to the dangers of the machine and the precautions to be observed to secure safe working of the machine.
6. Circular saws.-Every circular saw shall be fenced as follows:-
- (a) behind and in direct line with the saw there shall be a riving knife, which shall have a smooth surface, shall be strong, rigid and easily adjustable, and shall also conform to the following conditions:-
 - (i) the edge of the knife nearer the saw shall form an arc of a circle having a radius not exceeding the radius of the largest saw used on the bench;
 - (ii) the knife shall be maintained as close as practicable to the saw, having regard to the nature of the work being done at the time, and at the level of the bench table. The distance between the front edge of the knife and the teeth of the saw shall not exceed 12 millimeters; and
 - (iii) for a saw of a diameter of less than 60 cm., the knife shall extend upwards from the bench table to within 25 mm. of the top of the saw, and for a saw of a diameter 60 cm. or over shall extend upwards from the bench table to a height of at least 23 cm.
 - (b) the top of the saw shall be covered by a strong and easily adjustable guard, with a flange at the side of the saw farthest from the fence. The guard shall be kept so adjusted that the said flange shall extend below the roots of the teeth of the saw. The guard shall extend from the top of the riving knife to a point as low as practicable at the cutting edge of the saw; and
 - (c) the part of the saw below the bench table shall be protected by two plates of metal or other suitable material, one on each side of the saw; such plates shall not be more than 15 cm. apart, and shall extend from the axis of the saw outwards to a distance of not less than 5 cm. beyond the teeth of the saw. Metal plates, if not beaded, shall be of a thickness of at least 2.5 mm., or if beaded, be of a thickness of at least 1.25 mm.
7. Push Sticks.-A push stick or other suitable appliance shall be provided for use at every circular saw and at every vertical spindle moulding machine to enable the work to be done without unnecessary risk.
8. Band saws.-Every band saw shall be guarded as follows:-
- (a) both sides of the bottom pulley shall be completely encased by sheet or expanded metal or other suitable material;

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- (b) the front of the top pulley shall be covered with sheet or expanded metal or other suitable material; and
 - (c) all portions of the blade shall be enclosed or otherwise securely guarded, except the portion of the blade between the bench table and the top guide.
9. Planing machines.-
- (a) A planing machine (other than a planing machine which is mechanically fed) shall not be used for overhand planing unless it is fitted with a cylindrical cutter block.
 - (b) Every planing machine used for overhand planing shall be provided with a "bridge" guard capable of covering the full length and breadth of the cutting slot in the bench, and so constructed as to be easily adjusted both in a vertical and horizontal direction.
 - (c) The feed roller of every planing machine used for thicknessing, except the combined machine for overhand planing and thicknessing, shall be provided with an efficient guard.
10. Adjustment and maintenance of guards.-The guards and other appliances required under this schedule shall be -
- (a) maintained in an efficient state;
 - (b) constantly kept in position while the machinery is in motion; and
 - (c) so adjusted as to enable the work to be done without unnecessary risk.
11. Exemptions.-Paragraphs 6, 8, 9 and 10 shall not apply to any woodworking machine in respect of which it can be proved that other safeguards are provided, maintained and used which render the machine as safe as it would be if guarded in the manner prescribed in this schedule.

SCHEDULE II

CENTRIFUGAL MACHINES

- 1. Definition.-"Centrifugal machines" include centrifugal extractors, separators and driers.
- 2. Every part of centrifugal machine shall be
 - (a) of good design and construction and of adequate strength;
 - (b) properly maintained; and

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- (c) examined thoroughly by a competent person at regular intervals to check for unbalance & in case unbalance at high speeds is observed steps to restore the balance shall be taken before commissioning the machine.
- 3. Interlocking guard for drum or basket.-
 - (a) The cage housing the rotating drum or basket of every centrifugal machine shall be provided with a strong lid. The design and construction of the cage as well as the lid shall be such that no access is possible to the drum or basket when the lid is closed.
 - (b) Every centrifugal machine shall be provided with an efficient interlocking device that will effectively prevent the lid referred to in sub-paragraph (a) from being opened while the drum or basket is in motion and prevent the drum or basket being set in motion while the lid is in the open position.
- 4. Braking arrangement.-Every centrifugal machine shall be provided with an effective braking arrangement capable of bringing the drum or basket to rest within as short a period of time as reasonably practicable after the power is cut off.
- 5. Operating speed.-No centrifugal machine shall be operated at a speed in excess of the manufacturer's rating which shall be legibly stamped at easily visible places both on the inside of the basket and on the outside of the machine casing.

SCHEDULE III

POWER PRESS

- 1. Application.- The Schedule shall apply to all types of power presses including press brakes, except when used for working hot metal.
- 2. Definition.- For the purpose of this Schedule -
 - (a) "approved" means approved by the Competent Authority;
 - (b) "fixed fencing" means fencing provided for the tools of a power press being fencing which has no moving parts associated with or dependent upon the mechanism of a power press and includes that part of a closed tool which acts as a guard;
 - (c) "power press" means a machine used in metal or other industries for moulding, pressing, blanking raising drawing and similar purposes;
 - (d) "safety device" means the fencing and any other safeguard provided for the tools of a power press.
- 3. Starting and stopping mechanism.- The starting and stopping mechanism shall be provided with a safety stop so as to prevent

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over running of the press or descent of the ram during tool setting, etc.

4. Protection of tool and die.-

- (a) Each press shall be provided with a fixed guard with a slip plate on the underside enclosing the front and sides of the tool.
- (b) Each die shall be provided with a fixed guard surrounding its front and sides, and extending to the back in the form of a tunnel through which the pressed article falls to the rear of the press.
- (c) The design, construction and mutual position of the guards referred to in (a) and (b) such as to preclude the possibility of the worker's hand or fingers approaching the danger zone.
- (d) The machine shall be fed through a small aperture at the bottom of the die guard, but a wider aperture may be permitted for second or subsequent operations if feeding is done through a chute.
- (e) Notwithstanding anything contained in sub-clauses (a) and (b) an automatic or an inter-locked guard may be used in place of a fixed guard, but where such guards are used they shall be maintained in an efficient working condition and if any guard develops a defect, the power press shall not be operated unless the defect of the guard is removed.

5. Appointment of persons to prepare power presses for use .-

- (a) Except as provided in paragraph (4), no person shall set, re-set, adjust or try out the tools on a power press or install or adjust any safety device thereon, being installation or adjustment preparatory to production of die proving, or carry out an inspection and test of any safety device thereon required by paragraph 8 unless he-
 - (i) has attained the age of eighteen;
 - (ii) has been trained in accordance with the sub-paragraph (b); and
 - (iii) has been appointed by the occupier of the factory to carry out those duties in respect of the class or description of power press or the class or description of safety device to which the power press or the safety device (as the case may be) belongs; and the name of every such person shall be entered in a register in Form 1.

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- (b) The training shall include suitable and sufficient practical instruction in the matters in relation to each type of power press & safety device in respect of which it is proposed to appoint the person being trained.
6. Examination and testing of power presses and safety devices.-
- (a) No power press or safety device shall be taken into use in any factory for the first time in that factory, or in case of a safety device for the first time on any power press, unless it has been thoroughly examined and tested, in the case of a power press, after installation in the factory, or in the case of a safety device, when in position on the power press in connection with which it is to be used.
 - (b) No power press shall be used unless it has been thoroughly examined and tested by a competent person within the immediately preceding period of 12 months.
 - (c) No power press shall be used unless every safety device (other than fixed fencing) thereon has within the immediately preceding period of six months when in position on that power press, been thoroughly examined and tested by a competent person.
 - (d) The competent person carrying out an examination and test under the foregoing provisions shall make a report of the examination and test containing the following particulars and every such report shall be kept readily available for inspection:
 - (i) name of the occupier of the factory;
 - (ii) address of the factory;
 - (iii) identification number or mark sufficient to identify the power press or the safety device;
 - (iv) date on which the power press or the safety device was first taken into use in the factory;
 - (v) the date of each periodical thorough examination carried out as per requirements of sub-paragraph (b) above;
 - (vi) particulars of any defects affecting the safe working of the power press or the safety device found at any such thorough examination and steps taken to remedy such defects;

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7. Defects disclosed during a thorough examination and tests .-

- (a) Where any defect is disclosed in any power press or in any safety device by any examination and test under paragraph 6 and in the opinion of the competent person carrying out the examination and test, either-
 - (i) the said defect is a cause of danger to workers and in consequence the power press or safety device (as the case may be) ought not to be used until the said defect has been remedied; or
 - (ii) the said defect may become a cause of danger to workers and in consequence the power press or safety device (as the case may be) ought not to be used after the expiration of a specified period unless the said defect has been remedied.

Such defect shall, as soon as possible after the completion of the examination and test, be notified in writing by the competent person to the occupier of the factory and, in the case of a defect falling within clause (ii) of this sub-paragraph such notification shall include the period within which, in the opinion of the competent person, the defect ought to be remedied.

- (b) In every case where notification has been given under this paragraph, a copy of the report made under paragraph 6(d) shall be sent by the competent person to the inspector for the area within fourteen days of the completion of the examination and test.
- (c) Where any such defect is notified to the occupier in accordance with the foregoing provisions of this paragraph the power press or safety device (as the case may be) having the said defect shall not be used -
 - (i) in the case of a defect falling within clause(i) of sub- paragraph (a) until the said defect has been remedied; and
 - (ii) in the case of defect falling within clause (ii) of sub-paragraph (a), after the expiration of the specified period.
- (d) As soon as is practicable after any defect of which notification has been given under sub-paragraph(a) has been remedied, a record shall be made by or on behalf of the occupier stating the measures by which and the date on which the defect was remedied.

8. Inspection and test of safety devices.-

- (a) No power press shall be used after the setting, resetting or adjustment of the

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tools thereon unless a person appointed or authorised for the purpose under Paragraph 5 has inspected and tested every safety device thereon while it is in position on the said power press:

Provided that any inspection, test and certificate as aforesaid not be required where any adjustment of the tools has not caused or resulted in any alteration to or disturbance of any safety device on the power press and if, after the adjustment of the tools, the safety devices remain, in the opinion of such a person as aforesaid, in efficient working order.

- (b) Every power press and every safety device thereon while it is in position on the said power press shall be inspected and tested by a trained person every day.
9. Defects disclosed during an inspection and test.-
- (a) Where it appears to any person as a result of any inspection and test carried out by him under paragraph 8 that any necessary safety device is not in position or is not properly in position on a power press or that any safety device which is in position on a power press is not in his opinion suitable, he shall notify the manager forthwith.
 - (b) Except as provided in sub-paragraph (c) where any defect is disclosed in a safety device by any inspection and test under paragraph 8, the person carrying out the inspection and test shall notify the manager forthwith.
 - (c) Where any defect in a safety device is the subject of a notification in writing under paragraph 7 by virtue of which the use of the safety device may be continued during a specified period without the said defect having been remedied, the requirement in sub-paragraph (b) of this paragraph shall not apply to the said defect until the said period has expired.
10. Identification of power presses and safety devices.- For the purpose of identification every power press and every safety device provided for the same shall be distinctively and plainly marked.
11. Training and instructions to operators.- The operators shall be trained and instructed in the safe method of work before starting work on any power press. It shall be ensured by adequate supervision that correct operating procedures are being followed.
12. Exemptions.-
- (a) If in respect of any factory, the Competent Authority is satisfied that owing to the circumstances or infrequency of the processes or for any other reason, all or any of the provisions of this Schedule are not necessary for the

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protection of the workers employed on any power press or any class or description of power press or in the factory, the Competent Authority by a certificate in writing(which he may in his discretion revoke at any time), exempt such factory from all or any of such provisions subject to such conditions, if any, as he may specify therein.

- (b) Where such exemption is granted, a legible copy of the certificate, showing the conditions (if any) subject to which it has been granted, shall be kept posted in the factory in a position where it may be conveniently read by the persons employed.

SCHEDULE IV

WELDING AND GAS CUTTING

1. Arc Welding.-

- (a) Definition.- Arc welding is a welding process wherein coalescence is produced by heating with an electric arc, with or without application of pressure and with or without the use of filler metal.
- (b) Correct and proper electric earthing shall be provided for the welding machine, the casing and the job to be welded. These shall be electrically checked for any leakage of current by an authorised and trained electrician.
- (c) The welding machine shall be kept at a dry place and materials shall not be kept around it.
- (d) The welding cable shall be in good condition. The metal wire shall not be in an exposed state anywhere. The welding cable connections shall be tight. The cable shall not lie on wet surface nor shall it pass through water. Building structure, fuel tanks, railings etc., shall not be used to support welding cables. As far as possible cable shall not be laid across the passages.
- (e) The welder shall not wear any wet dresses, footwear, hand gloves etc. These articles must be dry before working with welding machines. The welder shall wear rubber shoes, hand gloves and use welding screens while doing welding jobs. Welding screen shall be used around the welding area to stop welding flashes from affecting others. The welder must check the welding holder thoroughly before starting the job and shall also see that the insulation of the holder is proper.
- (f) The welding cable and holder etc., shall be fastened to the overhead structures with non-conductors to prevent these from dropping down.

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- (g) Scaffolding made of corrugated sheets shall be used below the areas where welding is to be done to prevent sparks dropping down below.
- (h) While welding in confined areas like inside of tanks, pipes etc., proper ventilation shall be provided with the help of a fan.
- (i) Welding on a gas or fuel line shall never be done without a special approved procedure written specially for the particular job.
- (j) All welding work shall be started only after obtaining a welding permit from authorised agency indicating special precautions including the fire fighting details.
- (k) For welding work on overhead equipment such as crane etc. a separate earth cable shall be run up to the work place and shall be connected to work piece.

2. Gas Cutting.-

- (a) Definition.- Gas cutting is a process used for cutting mild steel by a flame torch using compressed gases Hydrogen/Acetylene and oxygen to preheat the metal and cutting it by forcing oxygen at higher pressure.
- (b) The gas cylinders shall be kept well away from any fire or hot areas. The rubber pipes, joints, gas torches, valve connections shall be thoroughly checked for leakage of gas.
- (c) The gas cutter shall use proper safety appliances viz. gas cutters goggles, hand gloves, safety shoes, helmets and safety belts.
- (d) The rubber hose shall not come in contact with any hot material and it shall not be taken through hot areas.
- (e) The gas torch shall be fastened to a fixed overhead structural or with the body of the gas cutter to stop it from dropping down.
- (f) The rubber hose shall not obstruct the movement of others. When necessary to lower the rubber hose with fittings, a fibre rope should be used. A metal sheet shall be used below the job to arrest any sparks/hot slags from falling down.
- (g) Before starting any gas cutting, a written permit clearance shall be obtained from authorised person which will indicate all Safety precautions including fire fighting details.
- (h) Gas cutting at or near fuel line/hazardous area etc., shall be done only after obtaining a special approved procedure for that job.
- (i) Provisions of Gas Cylinder Rules shall be complied with.

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SCHEDULE V

SHEARS, SLITTERS AND GUILLOTINE MACHINES

1. Definition.- For the purpose of this Schedule -
 - (a) "guillotine" means a machine ordinarily equipped with straight, bevel-edged blade operating vertically against a stationery resisting edge and used for cutting metallic or non- metallic substances;
 - (b) "shears" or "shearing machine" means a machine ordinarily equipped with straight, bevel-edged blades operating vertically against resisting edges, or with rotary, overlapping cutting wheels, and used for shearing metals or non-metallic substances; and
 - (c) "slitter" or "slitting machine" means a machine ordinarily equipped with circular disc-type knives, and used for trimming or cutting into metal or non-metallic substances or for slitting them into narrow strips; for the purpose of this Schedule, this term includes bread or other food slicers equipped with rotary knives or cutting discs.
2. Guillotine and Shears.-
 - (a) Where practicable, a barrier metal guard of adequate strength shall be provided at the front of the knife, fastened to the machine frame and shall be so fixed as would prevent any part of the operator's body to reach the descending blade from above, below or through the barrier guard or from the sides:

Provided that in case of machines used in the paper printing and allied industries, where a fixed barrier metal guard is not suitable on account of the height and volume of the material being fed, there shall be provided suitable starting devices which require simultaneous action of both the hands of the operator or an automatic device which will remove both the hands of the operator from the danger zone at every descent of the blade.
 - (b) At the back end of such machines, an inclined guard shall be provided over which the slit pieces would slide and be collected at a safe distance in a manner as would prevent a person at the back from reaching the descending blade.
 - (c) Power-driven guillotine cutters, except continuous feed trimmers, shall be equipped with -
 - (i) starting devices which require the simultaneous action of both hands to start the cutting motion and of at least one hand on a control during the complete stroke of the knife; or

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- (ii) an automatic guard which will remove the hands of the operator from the danger zone at every descent of the blade, used in conjunction with one-hand starting devices which require two distinct movements of the device to start the cutting motion, and so designed as to return positively to the non-starting position after each complete cycle of the knife.
 - (d) Where two or more workers are employed at the same time on the same power-driven guillotine cutter equipped with two- hand control the device shall be so arranged that each worker shall be required to use both hands simultaneously on the safety trip to start the cutting motion, and at least one hand on a control to complete the cut.
 - (e) Power-driven guillotine cutters, other than continuous trimmer, shall be provided, in addition to the brake or other stopping mechanism, with an emergency device which will prevent the machine from operating in the event of failure of the brake when the starting mechanism is in the non-starting position.
3. Slitting Machines.-
- (a) Circular disc-type knives on machines for cutting metal and leather, paper, rubber, textiles or other non-metallic substances shall, if within reach of operators standing on the floor or working level, be provided with guards enclosing the knife edges at all times as near as practicable to the surface of the material, and which may either-
 - (i) automatically adjust themselves to the thickness of the material; or
 - (ii) be fixed or manually adjusted so that the space between the bottom of the guard and the material will not exceed 6 mm (1/4 in.) at any time.
 - (b) Portions of blades underneath the tables or benches of slitting machines shall be covered by guards.
4. Index Cutters and Vertical Paper Slotters.- Index cutters, and other machines for cutting strips from the ends of books, and for similar operations, shall be provided with fixed guards, so arranged that the fingers of the operators cannot come between the blades and the tables.
5. Corner Cutters.- Corner cutters, used in the manufacture of paper boxes, shall be equipped with -
- (a) suitable guard fastened to the machines in front of the knives and provided with slots or perforations to afford visibility of the operations; or
 - (b) other guards equally efficient for the protection of the fingers of the workers.

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6. Band Knives.- Band wheels on band knives, and all portions of the blades except the working side between the sliding guide and the table on vertical machines, or between the wheel guards on horizontal machines, shall be completely enclosed with hinged guards of sheet metal not less than 1 mm(0.04 in) in thickness or of other material of equal strength.

SCHEDULE VI

AGITATORS AND MIXING MACHINES

1. Definition.- "Agitators and Mixing Machines" means a tank or other container equipped with power-driven mixing arms, blades or paddle wheels fixed to revolvable shafts or other simple mechanical devices for blending stirring liquids with other liquids or with solid substances or combinations of these.
2. When the top of an open agitator tank, beater tank or paddle tank or similar vessel is less than 1 M above the adjacent floor or working level, adequate standard railings shall be installed on all open sides.
3. Agitators and mixing machines shall be provided with an efficient inter-lock arrangement for the top lid, to prevent access to the agitating, stirring or similar devices, whilst in motion and would prevent restart under power with the lids in open position.
4. When other inspection or examination openings are provided at the top or sides of the containers vessels of the agitator and mixing machines, such openings shall be provided with standard grill guards as would prevent access of any part of the operator's body coming in contact with agitator stirring or similar devices whilst in motion.
5. When discharge holes, openings, chutes or similar arrangements are provided at bottom or at the sides of the container vessels of the agitator and mixing machines, they shall, be so designed, shaped guarded, or situated as would prevent access of any part of operator's body coming in contact with agitating, stirring or similar devices, whilst in motion inside the vessel.

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SCHEDULE VII

CONVEYORS

1. Application.- The schedule shall apply to all types of conveyors.
2. Definition.- Conveyor means a horizontal, inclined or vertical device for moving or transporting bulk materials, packages & objects in a path predetermined by the design of device and having points of loading or discharge fixed or selective.
3. General.- The conveyors shall be so designed installed, operated & maintained as per the national code & standards. Safe procedures shall be laid down to include the following, namely:-
 - (a) All moving parts of conveyors such as gears, sprockets, sheaves etc. shall be guarded;
 - (b) The starting switch of conveyor shall be located at such a place so that the operator shall have clear view of the entire conveyor length;
 - (c) The entire system shall be so interlocked by electrical or mechanical means that it can stop automatically if there is a blockage at any place along the length;
 - (d) Conveyors operating in series shall have controls so designed that if one of the conveyor stops others shall automatically stop;
 - (e) Electrical machines operating the conveyors equipped with brakes which are mechanically applied or released by movement of operating device, shall be so designed that if the electrical power is interrupted with brakes in OFF position, load can descend only at controlled speed;
 - (f) Antirunaway or backstop devices shall be provided on reversible type of conveyors where reversing can cause hazard;
 - (g) Overload protecting devices shall be provided on conveyors which shall disconnect the electrical power. All restarting devices shall remain locked till the cause of overload is removed;
 - (h) For conveyors feeding the hopper at or near level of floor, the hopper shall be provided with screen or railing and toe-board;
 - (i) Conveyors handling flammable material or fine powders shall have only explosion proof electrical fixtures. The dust levels in the area shall be restricted to PLE Limits by suitable means; and
 - (j) Conveyors running in tunnels & pits shall have sufficient clearance at sides for workers engaged in lubricating or repair works.
4. Conveyors at height.-
 - (a) Conveyors at elevated locations shall be provided with access platform with toe-board & guard rails.

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- (b) Conveyors installed within 2 metres of floor or walkway surface shall be provided with crossovers or passages
 - (c) Overhead conveyors shall be provided with sideboards along the edges & screen guards underneath. Underpasses shall be provided with sheet metal ceiling for protection of the persons crossing.
 - (d) Conveyors passing through building floors, walls shall have interlocks installed in such a way that all will have to operate at one time to start the system. These switches shall be clearly marked & area near them shall be kept clean and free of obstructions. The openings shall be guarded with hand rails, toe-boards etc.
5. Maintenance.- The operation, maintenance of conveyors shall be done under work permit system keeping in mind the nature of materials handled. The entire mechanism of conveyors, electrical switches, interlocks etc. shall be inspected and maintained regularly especially for brakes, back stops, anti-runaway devices, overload releases and such other safety devices.
6. Fire Fighting.- The entire length of the conveyor shall be covered by installation of fire detection and warning system. Wherever conveyor passes through wall or floor openings, automatic system shall be installed for closing of them to stop the passage of flame through them. Wherever necessary automatic water sprinkler system shall also be provided.
- 33. Register of workers employed for work on or near machinery in motion.-In every factory a register shall be maintained in Form 1 in which the name and other particulars of every such worker as may be employed for such examination or operation as referred to in the proviso to sub-section (1) of section 21 shall be entered.**
- 34. HOISTS AND LIFTS.-**
- (1) A register shall be maintained to record particulars of examination of hoists and lifts and shall give particulars as shown in Form 3.
 - (2) In pursuance of the provisions of sub-section (4) of Section 28, in respect of any class or description of hoist or lift specified in the first column of the following Schedule, the requirements of section 28 specified in the second column of the said Schedule and set opposite to that class or description of hoist or lift shall not apply.

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<u>Class or description of hoist or lift</u>	<u>Requirements which shall not apply</u>
Hoists or lifts mainly used for raising materials for charging blast furnaces or lime kilns.	Sub-section 1(b) in so far as it requires a gate at the bottom landing; sub-section 1(d); sub-section 1(e)
Hoists not connected with mechanical power and which are not used for carrying persons.	Sub-section 1(b) in so far as it requires the hoistway or liftway enclosure to be so constructed as to prevent any person or thing from being trapped between any part of the hoist or lift and any fixed structure or moving part; sub-section 1(e)

35. LIFTING MACHINES, CHAINS, ROPES AND LIFTING TACKLES.-

- (1) No lifting machine and no chain, rope or lifting tackle, except a fibre rope or fibre rope sling, shall be taken into use in any factory for the first time in that factory unless it has been tested and all parts have been thoroughly examined by a competent person and a certificate of such a test and examination specifying the safe working load or loads and signed by the person making the test and the examination, has been obtained and is kept available for inspection.
- (2) Every jib-crane so constructed that the safe working load may be varied by the raising or lowering of the jib, shall have attached there to either an automatic indicator of safe working loads or an automatic jib angle indicator and a table indicating the safe working load at corresponding inclinations of the jib or corresponding radii of the load. An audio-visual alarm be preferably provided in addition, to give alarm wherever the limits given in table are exceeded.
- (3) A table showing the safe working loads of every kind and size of chain, rope or use, and, in the lifting tackle in case of a multiple sling, the safe working loads at different angles of the legs, shall be pasted in the store in which the chains, ropes or lifting tackles are kept, and in prominent positions on the premises, and no chain, rope or lifting tackle not shown in the table shall be used:

Provided that this sub-rule shall not apply in respect of such lifting tackle if the safe working load thereof, or in the case of a multiple sling, the safe working load at different angles of the legs, is plainly marked upon it.

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- (4) The register to be maintained under clause (a)(iii) of sub-section (1) of Section 29 of the Act shall contain the report as given in Form - 4, giving following particulars and shall be kept readily available for inspection:-
- (a) Name of occupier of factory.
 - (b) Address of factory.
 - (c) Distinguishing number or mark, if any, and description sufficient to identify the lifting machine, chain, rope, or the lifting tackle.
 - (d) Date when the lifting machine, chain, rope or lifting tackle was first taken into use in the factory.
 - (e) Date and number of the certificate relating to any test and examination made under sub-rules (1) and (15) together with the name and address of the person who issued the certificate.
 - (f) Date of each periodical thorough examination made under clause (a) (iii) of sub-section(1) of Section 29 of the Act and sub-section (3) and by whom it was carried out.
 - (g) Date of annealing or other heat treatment of the chain and other lifting tackle made under sub-rule (7) and by whom it was carried out.
 - (h) Particulars of any defects affecting the safe working load found at any such thorough examination or after annealing and of the steps taken to remedy such defects.
- (5) All rails on which a travelling crane moves and every track on which the carriage of a transporter or runway moves shall be of proper size and adequate strength and have an even running surface; and every such rail or track shall be properly laid, adequately supported and properly maintained.
- (6) To provide access to rail tracks of overhead travelling cranes suitable passage-ways of at least 50 centimeters width with toeboards and double hand rails 90 centimeters high shall be provided alongside, and clear of, the rail tracks of overhead travelling cranes, such that no moving part of the crane can strike persons on the ways, and the passage-way shall be at a lower level than the crane track itself. Safe access ladders shall be provided at suitable intervals to afford access to these passage-ways, and from passage-ways to the rail tracks:
- Provided that the Competent Authority may, for reasons to be specified in writing, exempt any factory in respect of any overhead travelling crane from the operation of any provision of this sub-rule subject to such conditions as it may specify.
- (7) All chains and lifting tackles except a rope sling shall, unless they have been subjected to such other heat treatment as may be approved by the Competent Authority of Factories, be effectively annealed under the supervision of a competent person at the following intervals:-

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- (a) all chains, slings, rings, hooks, shackles and swivels used in connection with molten metal or molten slag or when they are made of 12.5 millimeters bar or smaller, once at least in every six months; and
- (b) all other chains, rings, hooks, shackles and swivels in general use, once at least in every twelve months:

Provided that chains and lifting tackle not in frequent use shall, subject to the Competent Authority's approval, be annealed only when necessary. Particulars of such annealing shall be entered in a register prescribed under sub-rule (4).

- (c) Slings-
 - (i) Chains shall not be joined by bolting or wiring links together. They shall not be shortened by tying knots. A chain in which the links are locked, stretched or do not move freely shall not be used. The chain shall be free of kinks and twists. Proper eye splices shall be used to attach the chain hooks.
 - (ii) Pulley blocks of the proper size shall be used to allow the rope free play in the sheave grooves and to protect the wire rope from sharp bends under load. Idle sling shall not be carried on the crane hook along with a loaded sling. When idle slings are carried they shall be hooked.
 - (iii) While using multilegged slings, each sling or leg shall be loaded evenly and the slings shall be of sufficient length to avoid a wide angle between the legs.
 - (iv) Sling hitches on loads shall be made under the supervision of experienced persons.

- (8) Nothing in the foregoing sub-rule (7) shall apply to the following classes of chains and lifting tackles, namely:-

- (a) chains made of malleable cast iron;
- (b) plate link chains;
- (c) chains, rings, hooks, shackles and swivels made of steel or of any non-ferrous metal;
- (d) pitched chains, working on sprocket or pocketed wheels;
- (e) rings, hooks, shackles and swivels permanently attached to pitched chains, pulley blocks or weighing machines;
- (f) hooks and swivels having screw threaded parts or ball bearing or other case hardened parts;
- (g) socket shackles secured to wire ropes by white-metal capping; and
- (h) bordeaux connections:

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Provided that such chains and lifting tackles shall be thoroughly examined by a competent person once at least in every twelve months, and particulars entered in the register kept in accordance with sub-rule (4).

- (9) Cranes shall be operated only by authorised persons who are well trained and experienced, operators shall ensure that all safety devices are functioning properly before crane is put into operation.
- (10) A mobile crane shall be operated so that none of its parts can approach live electric lines closer than 3 m. While lifting loads such a crane shall be located on level ground.
- (11) Standard signals shall be used and operators shall recognise signals from only one person during crane operation. Signal men shall direct equipment movement at fills, quarries, pits, intersections or any other place where necessary to prevent possible accidents.
- (12) No person shall be permitted to work or walk under a load.
- (13) Thorough inspection and load testing of a crane shall be done by a competent person at least once every 12 months. The load to be used for the purpose of testing shall be as follows:

Safe working load Test load

Up to 20 tons 25% in excess

20 - 50 tons 5 tons in excess

Over 50 tons 10% in excess
- (14) All lifting machines, ropes, chains and lifting tackles, except a fibre rope or fibre sling, which have been lengthened, altered or repaired by welding or otherwise, shall, before being again taken into use, be adequately re-tested and re-examined by a competent person and certificate of such test and examination be obtained, and particulars entered in the register kept in accordance with sub-rule (4).
- (15) No person under 18 years of age and no person who is not sufficiently competent and reliable shall be employed as driver of a lifting machine whether driven by mechanical power or otherwise, or to give signals to a driver.
- (16) Where the Competent Authority is satisfied that in a factory due to shutdown or for any other reasons it is not practicable to maintain a minimum distance of 6 metres between the person employed or working on or near the wheel track of a travelling crane and the crane, it may on the request of the manager reduce the distance to such extent as it may consider necessary and also prescribe further precautions indicating appointment of suitable number of supervisors to ensure the safety of the persons while they are employed or working on or near the track.

Rules 35-36

36. PRESSURE VESSELS OR PLANTS.-

(1) Interpretation.-In this rule-

- (a) "design pressure" means the maximum pressure that a pressure vessel or plant is designed to withstand safely when operating normally;
- (b) "maximum permissible working pressure" means the maximum pressure at which a pressure vessel or plant is permitted to be operated or used under this rule and is determined by the technical requirement of the process;
- (c) "plant" means a system of piping that is connected to a pressure vessel and is used to contain a gas, vapour or liquid under pressure greater than the atmospheric pressure, and includes the pressure vessel;
- (d) "pressure vessel" means a vessel that may be used for containing, storing, distributing, transferring, distilling, processing or otherwise handling any gas, vapour or liquid under pressure greater than the atmospheric pressure and includes any pipeline fitting or other equipment attached thereto or used in connection therewith; and
- (e) "competent person" means a person as defined in Sr.No. 5. of schedule to rule 31.

(2) Exceptions.-Nothing in this rule shall apply to -

- (a) vessels made of ferrous materials having an internal operating pressure not exceeding 1 kilogram per square centimeter;
- (b) steam boilers, steam and feed pipes and their fittings coming under the purview of the Indian Boilers Act, 1923;
- (c) metal bottles or cylinders used for storage or transport of compressed gases or liquefied or dissolved gases under pressure covered by the Gas Cylinder Rules, 1981 framed under the Indian Explosives Act, 1884;
- (d) vessels in which internal pressure is due solely to the static head of liquid;
- (e) vessels with a nominal water capacity not exceeding 500 litres connected in a water-pumping system containing air that is compressed to serve as a cushion;
- (f) vessels for nuclear energy application shall be covered by rules framed by Competent Authority;
- (g) refrigeration plant having a capacity of 3 tons or less of refrigeration in 24 hours; and

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- (h) working cylinders of steam engines or prime movers, feed pumps and steam traps; turbine casings; compressor cylinders; steam separators or dryers; steam strainers; steam de-super- heaters; oil separators; air receivers for fire sprinkler installations; air receivers of monotype machines provided the maximum working pressure of the air receiver does not exceed 130 kPa (1.33 kg/sq.cm) and the capacity 85 litres; air receivers of electrical circuit breakers; air receivers of electrical relays; air vessels on pumps, pipe coils, accessories of instruments and appliances such as cylinders and piston assemblies used for operating relays and interlocking type of guards; vessels with liquids subjected to static head only; and hydraulically operating cylinders other than any cylinder communicating with an air loaded accumulator.
- (3) Design and construction.-Every pressure vessel or plant used in a factory -
- (a) shall be properly designed on sound engineering practice;
 - (b) shall be of good construction, sound material, adequate strength and free from any patent defects; and
 - (c) shall be properly maintained in a safe working condition:

Provided that the pressure vessel or plant in respect of the design and construction of which there is an Indian standard or a standard of the country of manufacture or any other law or regulation in force, shall be designed and constructed in accordance with the said standards, law or regulation, as the case may be, and a certificate thereof shall be obtained from the manufacturer or from the competent person which shall be kept and produced on demand by an Inspector.

- (4) Safety devices.-Every pressure vessel shall be fitted with-
- (a) a suitable safety valve or other effective pressure relieving device of adequate capacity to ensure that the maximum permissible working pressure of the pressure vessel shall not be exceeded. It shall be set to operate at a pressure not exceeding the maximum permissible working pressure and when more than one protective device is provided, only one of the devices need be set to operate at the maximum permissible working pressure and the additional device shall be set to discharge at a pressure not more than 5 percent in excess of the maximum permissible working pressure;
 - (b) a suitable pressure gauge with a dial range not less than 1.5 times the maximum permissible working pressure, easily visible and designed to show at all times the correct internal pressure and marked with a prominent red mark at the maximum permissible working pressure of the pressure vessel;
 - (c) a suitable nipple and globe valve connected for the exclusive purpose of attaching a test pressure gauge for checking the accuracy of the pressure gauge referred to in clause (b) of this sub-rule;
 - (d) a suitable stop valve or valves by which the pressure vessel may be isolated from other pressure vessels or plant or source of supply of pressure. Such a stop valve or valves shall be located as close to the pressure vessel as possible and shall be easily accessible;

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which shall be 1.5 times the maximum permissible working pressure:

Provided that the pressure vessel or plant which is so designed and constructed that it cannot be safely filled with water or liquid or is used in service when even some traces of water cannot be tolerated, shall be pneumatically tested at a pressure not less than the design pressure or maximum permissible working pressure as the case may be:

Provided further that the pressure vessel or plant which is lined with glass shall be tested hydrostatically or pneumatically as required at a pressure not less than the design pressure or maximum permissible working pressure as the case may be.

Explanation:- Design pressure shall be not less than the maximum permissible working pressure and shall take into account the possible fluctuations of pressure during actual operation.

- (b) No pressure vessel or plant shall be used in a factory unless there has been obtained from the maker of pressure vessel or plant or from the competent person a certificate specifying the design pressure or maximum permissible working pressure thereof, and stating the nature of tests to which the pressure vessel or plant and its fittings (if any) have been subjected, and every pressure vessel or plant so used in a factory shall be marked so as to enable it to be identified as to be the pressure vessel or plant to which the certificate relates and certificate shall be kept available for perusal by the Inspector.
- (c) No pressure vessel or plant shall be permitted to be operated or used at a pressure higher than its design pressure, or the maximum permissible working pressure as shown in the certificate.

(7) In-service test and examinations.-

- (a) Every pressure vessel or plant in service shall be thoroughly examined by a competent person -
 - (i) externally, once in every period of six months; and
 - (ii) internally, once in every period of twelve months:

Provided that if by reason of the construction of a pressure vessel or plant, a thorough internal examination is not possible, this examination may be replaced by a hydrostatic test which shall be carried out once in every period of two years:

Provided further that for a pressure vessel or plant in continuous process which cannot be frequently opened, the period observations, findings and conclusions with other relevant remarks with reasons and may authorise the pressure vessel or plant to be used and kept in operation subject to a lowering of maximum permissible working pressure, or to more frequent or special examination or test, or subject to both of these conditions.

Rules 36-38

- (b) A report of every examination or test carried out shall be completed in Form 5 and shall be signed by the person making the examination or test, and shall be kept available for perusal by the Inspector at all hours when the factory or any part thereof is working.
 - (c) Where the report of any examination under this rule specified any condition for securing the safe working of any pressure vessel or plant, the pressure vessel or plant shall not be used unless the specified condition is fulfilled.
 - (d) The competent person making report of any examination under this rule, shall within seven days of the completion of the examination, send to the Competent Authority a copy of the report in every case where the maximum permissible working pressure is reduced or the examination shows that the pressure vessel or plant or any part thereof cannot continue to be used with safety unless certain repairs are carried out or unless any other safety measure is taken.
- (10) Application of other laws.-
- (a) The requirements of this rule shall be in addition to and without any prejudice to and not in derogation of the requirements of any other law in force.
 - (b) Certificates or reports of any examination, or test of any pressure vessel or plant to which sub-rules (7) to (9) do not apply, conducted or required to be conducted under any other law in force and other relevant record relating to such pressure vessel or plant, shall be properly maintained as required under the said law and shall be produced on demand by the Inspector.

38. EXCESSIVE WEIGHTS.-

- (1) No person, unless aided by another person or any mechanical device, shall carry or move by hand or head any material, article, tool or appliance exceeding the maximum limit in weight set out in the following Table:-

TABLE	
Persons	Max. weight of material, article, tool or appliance in kg
a) Adult Male	55
b) Adult female	30

Provided that the dimensions of material, tool or appliance shall be such as not to make worker unstable and not to hurt others:

Provided further that pregnant females shall not be engaged for lifting loads.

- (2) No female worker shall engage in conjunction with others, in lifting carrying or moving by hand or on head any material article, tool or appliance if the weight thereof exceeds the lowest weight fixed by Table to sub rule (1) above for any of the persons engaged multiplied by the persons engaged.

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39. PROTECTION OF EYES.- Effective screens or suitable goggles shall be provided for the protection of persons employed in or in the immediate vicinity of the following processes, namely:-

- (1) The processes specified in Schedule I to this rule, being processes which involve risk of injury to eyes from particles or fragments thrown off in the course of the processes.
- (2) The processes specified in Schedule II to this rule, being processes which involve risk of injury to eyes by reason of exposure to excessive light or infra-red or ultra-violet radiations.

SCHEDULE I

INJURY TO EYE FROM PARTICLES

1. Breaking, cutting, dressing or carving of bricks, stone, concrete, slag or similar materials by means of a hammer, chisel, pick or similar hand tool, or by means of a portable tool driven by mechanical power, and the dry grinding of surfaces of any such materials by means of a wheel or disc driven by mechanical power, where in any of the foregoing cases, particles or fragments are liable to be thrown off towards the face of the operator in the course of the process.
2. Dry grinding of surfaces of metal by applying them by hand to a wheel, disc or band driven by mechanical power, and of surfaces of metal by means of a portable tool driven by mechanical power.
3. Dividing into separate parts of metal, bricks, stone, concrete or similar materials by means of a high speed saw driven by mechanical power or by means of an abrasive cutting-off wheel or disc driven by mechanical power.
4. Turning of metals or articles of metal, where particles or fragments are liable to be thrown off towards the face of the operator in the course of the process.
5. Drilling by means of portable tools, where particles or fragments are liable to be thrown off towards the face of the operator in the course of the process.
6. Welding and cutting of metals by means of an electric, oxy- acetylene or similar process.
7. Hot fettling of steel castings by means of a flux-injected burner or air torch, and de-seaming of metal.
8. Fettling of metal castings involving the removal of metal, including runners, gates and risers, and removal of any other material during the course of such fettling.
9. Chipping of metal, and chipping, knocking out, cutting out or cutting off of cold rivets, bolts, nuts, lugs, pins, collars or similar articles from any structure or plant, or from part of any structure or plant, by means of a hammer, chisel, punch or similar hand tool, or by means of a portable tool driven by mechanical power.
10. Chipping or scurfing of paint, scale, slag, rust or other corrosion from the surface of metal and other hard materials by means of a hand tool or by a portable tool driven by mechanical power.

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11. Breaking of scrap metal by means of a hammer or by means of a tool driven by mechanical power.
12. Routing of metal, where particles or fragments are liable to be thrown off towards the face of the operator in the course of the process.
13. Work with drop hammers and power hammers used in either case for the manufacture of forgings, and work by any person not working with such hammers, whose work is carried on in such circumstances and in such a position that particles or fragments are liable to be thrown off towards his face during work with drop hammers or power hammers.
14. Work at a furnace where there is risk to the eyes from molten metal.
15. Pouring or skimming of molten metal.
16. Work involving risk to the eyes from hot sand being thrown off.
17. Truing or dressing of an abrasive wheel.
18. Handling in open vessels or manipulation of strong acids or dangerous corrosive liquids or materials, and operation, maintenance or dismantling of plant or any part of plant being plant or part of plant which contains or has contained such acids, liquids or materials, unless the plant or part of plant has been so prepared (by isolation, reduction of pressure, or otherwise), treated, or designed and constructed as to prevent risk of injury.
19. Any other process wherein there is a risk of injury to eyes from particles or fragments thrown off during the course of the process.

SCHEDULE II

INJURY TO EYE FROM LIGHT AND RADIATION

1. Welding or cutting of metals by means of an electrical, oxy- acetylene or similar process.
2. All work on furnaces where there is risk of exposure to excessive light or infra-red radiations.
3. Process such as rolling, casting or forging of metals, where there is risk of exposure to excessive light heat or infra-red radiations.
4. Any other process wherein there is a risk of injury to eyes from exposure to excessive light or infra-red or ultra-violet radiations.

Rules 40-41

- 40. MINIMUM DIMENSIONS OF MANHOLES.-** Every chamber, tank, vat, pipe, flue or other confined space, which persons may have to enter and which may contain dangerous fumes to such an extent as to involve risk of the persons being overcome thereby, shall unless there is other effective means of egress, be provided with a manhole which may be rectangular, oval or circular in shape, and shall have the following dimensions as minimum, namely:-

Rectangular shape- 50 cm X 30 cm

Oval shape - Major & minor axis diameters 50 cm. and 30 cm. respectively.

Circular shape - 50 cm diameter

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- 41. EXEMPTIONS.-** The requirements of sub-section (4) of section 37 of the Act shall not apply to the following processes carried on in any factory, namely:-

- (1) the operation of repairing a water sealed gasholder by the electric welding process, subject to the following conditions, namely:-
- (a) the gasholder shall contain only the following gases, separately or mixed at a pressure greater than atmospheric pressure, namely, town gas, coke-oven gas, producer gas, blast furnace gas, or gases other than air, used in their manufacture:

Provided that this exemption shall not apply to any gasholder containing acetylene or mixture of gases to which acetylene has been added intentionally; and
 - (b) welding shall only be done by the electric welding process and shall be carried out by experienced operatives under the constant supervision of a competent person;
- (2) the operations of cutting or welding steel or wrought iron gas mains and services by the application of heat, subject to the following conditions, namely:-
- (a) the main or service shall be situated in the open air, and it shall contain only the following gases, separately or mixed at a pressure greater than atmospheric pressure, namely, town gas, coke-oven gas, producer gas, blast furnace gas, or gases other than air, used in their manufacture;
 - (b) the main or service shall not contain acetylene or any gas or mixture of gases to which acetylene has been added intentionally;
 - (c) the operation shall be carried out by an experienced person or persons and at least 2 persons (including those carrying out the operations) experienced in work on gas mains and over 18 years of age shall be present during the operation;
 - (d) the site of the operation shall be free from any flammable or explosive gas or vapour;
 - (e) where acetylene gas is used as a source of heat in connection with an operation, it shall be compressed and contained in a porous substance in a cylinder; and
 - (f) prior to the application of any flame to the gas main or service, this shall be pierced or drilled and the escaping gas ignited.

Rules -45

45. PLANNING OF BUILDING CONSTRUCTION & ROADS, SIDEWALKS.-

- (1) General.- All constructions shall conform to National Building Code of Indian Standards Institution now Bureau of Indian Standards.*
- (2) Means of access for industrial buildings.-
 - (a) Means of access for industrial buildings & those buildings which attract large crowd shall be adequate.

The length of the main access shall be determined by the distance from the farthest building to the public street. The length of the subsidiary accessories shall be measured from the point of its' origin to the next wider road on which it meets.
 - (b) Pathways: The approach to the buildings from road/street/internal means of access shall be adequate and through paved pathways.
 - (c) Intersection of Roads: For intersection junction of roads meeting at right angles as well as other than right angles, the rounding off or cut off or splay or similar treatment shall be done, depending upon the width of the roads, traffic, sighting angle etc. to provide clear sight distance.
 - (d) Speed Breakers & Pedestrian Passage: Speed breakers shall be provided on all roads which lead to main road near the junction. The pedestrian crossings shall be marked.
 - (e) Sign Boards & Signs: Sign boards displaying information on maximum permissible speeds and appropriate road signs wherever required shall be provided. The maximum permissible speed on internal roads shall be decided by the manager of the factory depending on the traffic, size and number of vehicles, number of persons working in a particular building etc. The sign boards, road signs & pedestrian crossings shall be of fluorescent paint. The speed limit on various roads shall be decided by the factory manager.
- (3) Guarding of pits, sumps, trenches, manholes etc.-Pits, sumps, trenches, manholes and any other openings in the wall or floor shall be adequately covered or guarded. these shall be periodically checked and record maintained.

* Note-The Code covers aspects of administrative regulations, development control rules & general building & fire protection requirements; rules for design of electrical, etc. installations; regulation for ventilation etc. & plumbing services; measures to ensure safety of workers & public during construction etc.

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46. CONSTRUCTION & ERECTION.-Manager shall take appropriate measures with the approval of the Inspector to minimise the effects of occupational hazards arising out of animals, reptiles, rodents, poisonous plants and weeds, weather conditions and living conditions.

(1) General.-

- (a) Site preparation - While preparing the site for construction, bush and other wood, debris, etc, shall be removed and promptly disposed of so as to minimize the attendant hazards.

Temporary buildings for construction offices and storage shall be so located as to cause the minimum fire hazards and shall be constructed from non-combustible materials as far as practicable.

- (b) Access for Fire Fighting Equipment & Vehicles - Access for fire fighting equipment shall be provided to the construction site at the start of construction and maintained until all construction work is completed:

- (i) Free access from the street to fire hydrants/static water tanks, where available, shall be provided and maintained at all times;
- (ii) No materials for construction shall be placed within 3m of hydrants/static water tanks; and
- (iii) During building operations, free access to permanent, temporary or portable first-aid fire fighting equipment shall be maintained at all times.

- (c) Access to the Upper Floors During Construction- In all buildings over two storeys high, at least one stairway shall be provided in usable condition at all times. This stairway shall be extended upward as each floor is completed. As far as possible, there shall be a handrail on the staircase.

(2) Storage, Stacking & Handling of Materials.-Construction of Plant and Building: Construction requires various kinds of materials such as cement; lime; masonry units; aggregate; fly ash; timber; protective clothing; electrical fittings etc. These shall be stored and handled as per prevalent good practices & relevant national standards in order to ensure quality & quantity of materials used in the construction and safety of personnel handling these materials.

(3) Safety Requirements for Erection of Structural Steel Work.-

- (a) Organization of Work - The agency responsible for erecting the steel work shall analyze the proposed erection scheme for safety. The erection scheme shall cover safety aspects right from the planning stage up to the actual execution of the work and make provision for personnel protective equipments.

(b) Safety of Men:

- (i) General - Skilled workers trained in relevant jobs shall only be employed in jobs requiring skills.
- (1) All personnel protective equipments like helmets, goggles, safety shoes, gloves, aprons etc. shall be suitable for the job & shall conform to relevant Indian Standards

Rule - 46

- (2) When the work is in progress, the area shall be cordoned off by barricades to structural components, or falling into excavated trenches or getting injured by falling objects.
 - (3) Warning signs shall be displayed where necessary to indicate hazards, for example (a) '440 VOLTS', (b) 'DO NOT SMOKE', (c) 'MEN WORKING AHEAD', etc.
 - (4) All electrically operated hand tools shall be provided with proper earthing.
 - (5) Hand lamps shall be of low voltage preferably 24 V to prevent electrical hazards.
- (ii) Anchors for guys or ties shall be checked for proper placement. The weight of concrete in which the anchors are embedded shall be checked for uplift and sliding:
- (1) Split-end eye anchors shall only be used in good, solid rock.
 - (2) The first load lifted by a guy derrick shall be kept at a small height for about 10 minutes and the anchors immediately inspected for any signs or indications of failure.
 - (3) When a number of trusses or deep girders are loaded in one car or on one truck, all but one being lifted shall be tied back unless they have been tied or braced to prevent their falling over and endangering men unloading.
 - (4) The erection gang shall have adequate supply of bolts, washers, rivets, pins, etc. of correct size. Enough number of bolts shall be used in connecting each piece using a minimum of two bolts in a pattern to ensure that the joint will not fail due to dead load and erection loads.

All splice connections in columns, crane girders, etc., shall be completely bolted or riveted or welded as specified in the drawing before erection.
 - (5) Safety belts shall always be provided & used for working at heights. The ropes shall be chemically treated to resist dew and rotting. These shall not be tied on sharp edges of steel structures. They shall be tied generally not more than 2 to 3 m. away from the belt.
 - (6) On a guy derrick or climbing crane job, the tool boxes used by the erection staff shall be moved to the new working floor each time the rig is changed. On a mobile crane job, the boxes shall be moved as soon as the crane starts operating in a new area too far away for the men to reach the boxes conveniently.

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- (7) Baskets or containers to hold small materials such as bolts and drift pins shall be provided to men working on floats or scaffolds. Men shall be trained to use such containers, and to keep small tools gathered up and put away in tool boxes when not in use. Material shall not be dumped overboard when a scaffold is to be moved. Rivet heaters shall have safe containers or buckets for hot rivets left over at the end of the day.
- (8) During the erection of tall buildings, nylon nets at a height of 3 to 4 m. shall be provided to ensure safety of men if there is a fall from heights.

In case of industrial buildings the height of which is in excess of 4 m a temporary strong net shall be provided below the roof, at a height of 3 m to 4 m above the floor, over which workers are working.

- (9) Safety Against Fire - A fire protection procedure shall be set up if there is to be any flame cutting, burning, heating, riveting or any operation that could start a fire. Following precautions shall be observed during welding and cutting operations.
 - (a) The workers shall be instructed not to throw objects like hot rivets, cigarette stubs, etc, around.
 - (b) Sufficient number of fire extinguishers, preferably of soda acid type shall be placed at strategic points. Extinguishers shall always be placed in cranes, hoists, compressors and similar places. Where electrical equipments are involved, CO2 or dry powder extinguishers shall be provided.
 - (10) Riding on a load, tackle or runner shall be prohibited.
 - (11) The load shall never be allowed to rest on wire ropes. Ropes in operation shall not be touched. Wire ropes/manila ropes conforming to acceptable standards shall be used for guying.
 - (12) Lifting Appliances - Necessary precautions as laid down in rule 37 shall be followed.
- (c) Safety of Structure: General -The structure itself shall be safeguarded during its erection & erection of columns shall be immediately followed by vertical bracing between columns before the roof structure is erected.

Rule 46**(4) Excavation.-**

- (a) Excavation shall be planned in advance so that hazards due to falling and things falling are avoided. Accident prevention measures shall be adopted and effectively carried out on each job because of inherent dangers.
- (b) Underground utilities such as water mains, drainage lines, electrical cables, gas lines etc. shall be located and protected wherever necessary.
- (c) Adequate measures shall be taken to prevent dislodgement of loose or unstable earth, rock or other material from falling into the excavation by proper timbering.
- (d) Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.
- (e) No excavation below the level of any foundation of a building or structure (if the excavation is liable to effect the building) shall be commenced unless adequate shoring has been provided to prevent any danger to the building.
- (f) In every excavation work along sloping ground, sides and slopes of ground shall be maintained in a safe condition by scaling, benching or barricading. Loose earth and loose rock shall be scaled continuously. To ensure safety of workers engaged on such work, each worker shall be provided with safety belt attached to a safety line. On steep slopes workers shall not be permitted to work one above the other. All such scaling work shall be done under good supervision.
- (g) All trenches, 120 cm or more in depth, shall at all times be supplied with at least one ladder for each 30 meters in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least one metre above the surface of the ground.
- (h) Every accessible part on an excavation or an opening in the ground into which a person is liable to fall vertically through a height of 2 meters, shall be barricaded to a height of one metre.
- (i) Measures shall be taken to prevent spectators and other workmen who are not engaged in excavation work, from approaching excavation areas by placing warning signals etc. near the site of the excavation. Provisions shall also be made to prevent animals from falling into excavation areas.

(5) Shoring.-

- (a) Additional precautions by way of shoring and bracing shall be taken to prevent slides, slips or caveins when excavations or trenches are made in locations subject to vibrations from railway or road traffic, the operation of machinery or any other source of vibration.
- (b) Excavation over 1.2 m in depth, unless in solid rock or hard soil shall be shored and braced or sloped to the angle of repose of the material when consolidated. All shoring and bracing shall extend to the bottom of the excavation when necessary.
- (c) No person shall work in an excavation shaft, earth work of tunnel unless all timbering or planks used therein has been inspected by a competent person before the commencement of the work.

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(6) Night work. –

- (a) Excavated area shall be adequately lighted up for night work.
- (b) During night, a red danger light shall be displayed at a conspicuous place near the excavation site to warn approaching traffic and men.

(7) Disposal of soil

The excavated material shall be dumped sufficiently away from the edge of the excavated trench to avoid the excavated material slipping and falling into the trench. The excavated materials and any other material or load shall not be dumped or placed within 1.5m of the edges of the trench or half of the depth of the trench whichever is more.

(8) Scaffolding:

- (a) Suitable scaffolds shall be provided for workmen for all works that cannot be done safely from the ground.
- (b) All the members of a scaffold such as planks, braces, vertical supports, horizontal supports shall be of sound material, good construction and of adequate strength. They shall be properly maintained.
- (c) No plank shall be kept loose so that levering of the plank is avoided. Nails of proper size shall be used for construction of scaffolds in sufficient numbers and driven fully in.
- (d) Scaffolding or staging more than 3.5 meters above the ground floor swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise secured at least one metre high above the the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
- (e) On unprotected scaffolds at high elevations the men must wear life belts suitably anchored to some substantial part of the structure.
- (f) Side screens shall be provided on scaffold erected along passageways.
- (g) The platform of a suspended scaffold shall not be less than 45 cm. wide and points of suspension not more than 3 m apart and so arranged, that, at the working position, the edge is as close as practicable to the working face when persons have to work in a sitting position. Suspended scaffolds shall be tested as before use to ensure that minimum safety factors are maintained. The test will be made by raising the working surface 30 cm. above the ground and loading it with at least three times the maximum weight that will be imposed upon it.

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- (h) A safe and convenient means of access shall be provided to the platform or scaffold. Means of access may be a portable ladder, fixed ladder, ramp or a stairway. The use of cross braces or frame work as means of access to the working surface shall not be permitted.
 - (i) All scaffolds, before use, shall be examined by the engineer in charge.
 - (j) Every working place and approach thereto, every place where raising or lowering operations with the use of lifting appliance are in progress and all openings dangerous to persons employed shall be adequately and suitably lighted.
 - (k) During dismantling of scaffolds necessary precautions shall be taken to prevent injury to persons due to fall of loose materials.
 - (l) Bracings and other members of the scaffolds shall not be removed prematurely while dismantling the entire scaffold which shall be maintained stable and rigid so as to avoid the danger of collapse.
 - (m) Care shall be taken to see that no uninsulated electric wire exists within 3 metres of the working platform, gangways, runs, etc. of the scaffold.
 - (n) Good house-keeping shall be maintained at all times upon scaffolds, platforms and ramps. Excessive storage of materials thereon shall be avoided. Care must be taken to avoid accumulation of small objects such as tools, pieces of
 - (c) A man shall be specially employed as signaller to watch the movement of the bucket and warn the crew and vibrator operators of the approaching bucket so that all workers may clear out of the area affected by the bucket. Signaller shall be so stationed in a safe place that they can see the entire area where concrete is being placed.
- (12) Work in open areas and specially at height shall be stopped under adverse weather conditions such as strong winds, snowfall, rainfall and under any other conditions specified by Safety Officer/Inspector.

47. TEMPORARY ELECTRICAL WIRING.-

- (1) Frayed and / or bare wires shall not be used for temporary electrical connections during construction. All temporary wiring shall be installed and supervised by a competent electrician. Adequate protection shall be provided for all electrical wiring laid on floor which may have to be crossed over by construction machinery or by the workmen. All flexible wiring connecting the electrical appliances shall have adequate mechanical strength and shall preferably be enclosed in a flexible metal sheath. Overhead wires/cables shall be so laid that they leave adequate head room. Clearance for the above shall be obtained from the competent person.
- (2) All electrical circuits, other than those required for illumination of the site at night, shall be switched off at the close of day's work. The main switch board from which connections are taken for lighting, power operated machinery, etc, shall be located in an easily accessible and prominent place. No article of clothing nor stores shall be kept at the back of or over the board or anywhere near it. One 3-kg/4.5-kg CO₂ extinguisher or one 5-kg dry powder extinguisher shall be provided near the switch board.

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- 48. BUILDINGS & STRUCTURES.-** No building, wall, chimney, bridge, tunnel, road, gallery, stairway, ramp, floor, platform, staging, or other structure, whether of a permanent or temporary character, shall be constructed, situated or maintained in any factory in such a manner as to cause risk of bodily injury.
- 49. MACHINERY AND PLANT.-** No machinery, plant or equipment shall be constructed, situated, operated or maintained in any factory in such a manner as to cause risk of bodily injury or adverse effect on health. The Safety Officer shall have authority to stop the work if he finds that unsafe practices are being followed and/or unsafe conditions exist.
- 50. METHODS OF WORK.-** No process or work shall be carried in any factory in such a manner as to cause risk of bodily injury. Schedule for Hand Tools & Portable Power Tools is given below.

SCHEDULE

HAND TOOLS & PORTABLE POWER TOOLS

1. Hand tools:-
- (a) Definition: Hand tool means any tool which is used without any external motive power.
 - (b) Hand tools shall be of good quality materials, conforming to relevant BIS standards and shall be used only for the job it is designed for. Non sparking tools such as that made of Beryllium Copper alloy shall be used for working in explosive areas.
 - (c) Workers shall be trained & instructed for proper use of tools such as files, hammers, hacksaws etc.
 - (d) Proper tool bags shall be provided to workers to carry the tools and not leaving them on floors, passages etc.
 - (e) Protective equipments such as gloves, goggles etc. shall be provided to and worn by the workers.
 - (f) The tools shall be inspected regularly, repaired and maintained.
2. Portable Power Tools.-
- (a) Definition: Portable Power Tool means a tool powered by electric or pneumatic power, operated by a single operator and which is transportable from place to place.
 - (b) Portable power tools shall conform to the relevant BIS standards and shall be used for the job it is designed for. Starting switches shall be located at such places where accidental starting cannot take place.
 - (c) Electrically operated tools shall be used only with 3 core cable with proper earthing provided. This should be checked before use.

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- (d) Electrically operated tools shall not be used where flammable vapours, gases or dusts are present, unless they are specially designed for use in such environment.
- (e) Proper guards shall be provided for tools such as grinders, saws etc. and operators shall be provided with personal protective equipments wherever required.
- (f) In case of pneumatic tools a short chain shall be provided for attaching the air hose and tools housings securely to prevent it from whipping in case of breaking of the coupling.
- (g) Periodic inspection and maintenance shall be carried out for electrical insulation, earthing, integrity etc.

51. STACKING AND STORING OF MATERIALS, ETC.- No materials or equipment shall be stacked or stored in such a manner as to cause risk of bodily injury.

52. LADDERS.-

- (1) Every ladder shall be of good construction, sound material and of adequate strength for the purpose for which it is used. The rungs shall be parallel, level and uniformly spaced at 30 cm.
- (2) Ladders shall be inspected regularly and repaired immediately. No ladder with defective or missing rungs shall be used. Wooden ladders shall not be painted. For preserving the material from deterioration linseed oil or clear varnish shall be used.
- (3) No portable single ladder shall be over 9 m in length while the width between side rails in rung ladder shall in no case be less than 28 cm for ladder up to and including 3 m in length. For longer ladders this width shall be increased at least 20 mm for each additional metre of length. Uniform step spacing shall not exceed 30 cm.
- (4) All ladders with spreading bases such as step and trestle ladders shall be equipped with rigid spreads or some other means to prevent their premature opening or closing.
- (5) Ladders shall be in a safe position before being climbed. The best angle for a ladder is 75 with the horizontal i.e., the distance of the base of the ladder from the wall, pole structure etc., as the case may be shall be 1/4th its length.
- (6) A ladder shall be stored upon brackets and in sheltered locations.
- (7) A ladder shall not be placed upon a box, barrel, or other movable insecure object and against a round or angular pillar such as pipe or narrow steel section etc.
- (8) Two ladders must not be spliced together as far as possible. When it is inevitable they shall be tied together properly to ensure rigidity. Extra parallel members at the point of splicing may be added to each of the main members of the ladder. Two ladders shall not be spliced together to provide access to a greater height than when a single ladder is used.

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- (9) Bamboo ladders shall be provided with twisted wire loops enclosing both longitudinal members to prevent them from opening outwards. However, such ladders where longitudinal members are reinforced with metal/wire loops shall not be used when working on electrical circuits.
- (10) Metal ladders with insulating rubber shoes shall only be used for working with electrical lines or in places where they may come in contact with such wires.
- (11) No worker shall work from a plank placed on the rungs of ladders.
- (12) All permanently installed vertical ladders above a height of 3 m shall have manguards provided.

53. OVENS AND DRIERS.-

- (1) Application - This rule shall apply to ovens and driers, except those used in laboratories or kitchens of any establishment and those which have a capacity below 325 litres.
- (2) Definition:- For the purpose of this rule, "oven or drier" means any enclosed structure, receptacle, compartment or box which is used for baking, drying or otherwise processing of any article or substance at a temperature higher than the ambient temperature of the air in the room or space in which explosive mixture of air and a flammable substance is likely to be evolved within the enclosed structure, receptacle, compartment or box or part thereof on account of the article or substance which is baked, dried or otherwise processed within it.
- (3) Separate electrical connection.- Electrical power supplied to every oven or drier shall be by means of a separate circuit provided with an isolation switch.
- (4) Design, Construction, examination and testing.-
 - (a) Every oven or drier shall be properly designed on sound engineering practice and be of good construction, sound materials and adequate strength, free from any patent defects and safe if properly used.
 - (b) No oven or drier shall be taken into use in a factory for the first time unless a competent person has thoroughly examined all its parts and carried out the tests as are required to establish that the necessary safe systems and controls provided for safety in operation for the processes for which it is to be used and a certificate of such examination and tests signed by that competent person has been obtained and is kept available for inspection.

55. EXAMINATION OF EYE SIGHT OF CERTAIN WORKERS.-

- (1) No person shall be employed to operate a crane, locomotive or fork-lift truck, or to give signals to a crane or locomotive operator unless his eyesight and colour vision have been examined and declared fit by a qualified ophthalmologist to work whether with or without the use of corrective glasses.

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- (2) The eye sight and colour vision of the person employed as referred to in clause 1 shall be examined at least once in every period of 12 months up to the age of 45 years and once in every 6 months beyond that age.
- (3) Any fee payable for an examination of a person under this sub-rule shall be paid by the contractor/occupier and shall not be recoverable from that person.
- (4) The record of examination or re-examination carried out as required under sub-rule 1 shall be maintained in Form-1.

57. QUALITY OF PERSONAL PROTECTIVE EQUIPMENT.-

All Personal Protective Equipment provided to workers as required under any of the provisions of the Act or the Rules shall conform to the relevant Indian Standards.

58. PROTECTIVE EQUIPMENT.- The Inspector may, having regard to the nature of the hazards involved in work and process being carried out, order the occupier or the manager in writing to supply to the workers exposed to particular hazard any personal protective equipment as may be found necessary.

59. THERMIC FLUID HEATERS.-

- (1) All heaters shall be of such construction that coils are removable for periodic cleaning, visual inspection and hydraulic test.
- (2) Suitable arrangements shall be made for cooling the furnace effectively in case of power failure.
- (3) Before restarting the furnace, it shall be effectively purged.
- (4) Velocity of flow of the thermic fluid shall not be allowed to fall below the minimum recommended by the manufacturers while the heater is in operation.
- (5) The thermic fluid shall be circulated in a closed circuit formation with an expansion cum deaerator tank. This tank shall be located outside the shed where the heater is installed.
- (6) Every heater shall be provided with a Photo-resistor actuated audio-visual alarm to indicate flame failure and automatic burner cut off.
- (7) The stack temperature monitor-cum-controller with audio- visual alarm shall be provided so as to warn the operator in case the outlet temperature exceeds the specified minimum.
- (8) Where inspection doors are provided on the furnace they shall be interlocked with the burner itself so that they cannot be opened until burner is shut off and furnace is cooled sufficiently.
- (9) All heaters shall also be provided with the following safety devices:-
 - (a) level control in the expansion tank;
 - (b) temperature control of thermic fluid;

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- (c) differential pressure switch on the outlet line of the heater tubes; and
 - (d) temperature control device for the fuel oil supply to the burner.
- (10) All evices mentioned in sub-rule (9) shall have interlocking arrangement with burner so that in case of any predetermined limits being crossed the supply of fuel and air to burner shall automatically be cut-off.
 - (11) All safety interlocks when operated shall be indicated on the control panel of the heater by a suitable audio visual alarm.
 - (12) Every heater unit shall be provided as a standard accessory an arrangement for sniffing with low pressure steam or nitrogen for putting out the fire.
 - (13) Electric panel for the heater shall be located near the heater but not so close as to be exposed to spilling or leaking oil.
 - (14) The heater shall be located in a place segregated from other manufacturing activities.
 - (15) Explosion vent shall be so installed that release takes place at safe location.
 - (16) The heater oil shall be subjected to pressure test by competent person once at least in every 12 months. The test pressure shall not be less than twice the operating pressure.
 - (17) If repairs are carried out to the coil, it shall be tested before taking it into use.
 - (18) The thermic fluid shall conform to the specifications prescribed by the manufacturer and shall be tested by competent person for suitability at least once in every three months period. Such tests shall include test for acidity, suspended matter, ash contents, viscosity and flash point.
 - (19) Cleaning of the internal surface of the heater or soot and check up of refractory surface on the inside shall be carried out every month or as often as required depending upon working conditions. The coils shall be removed and surface of the coils cleaned thoroughly once at least in a period of six months. The burner, nozzles, oil filters and pumps shall be cleaned once a week during the period of use.
 - (20) A separate register containing the following information shall be maintained,-
 - (a) weekly checks carried out confirming the effectiveness of the interlock;
 - (b) weekly checks confirming that all accessories are in good state of repairs; and
 - (c) information regarding fuel oil temperature, pressure, thermic fluid inlet/outlet pressure and temperature, fuel gas temperature, recorded at 4 hourly interval.
 - (21) The heater when in operation shall always be kept in charge of a trained operator.
- 60. RECORD KEEPING & ANNUAL REVIEW.**-Each factory shall maintain a record of field equipment failures and Failure Mode, Effect & Criticality Analysis in prescribed Forms 7 & 8 respectively. This data and analysis shall be used for preparation of preventive maintenance schedules and prevention of potential hazards. In addition, the factory shall conduct an annual review of unusual occurrences and accidents occurred and submit the report to the Competent Authority.

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61. COLOUR CODING OF SERVICE LINES.-

- (1) Pipelines for water, air, oil and gases shall be colour coded as per Indian Standard: 2379-1963 & Indian Standard: 5-1978.
- (2) Electrical conduit panels shall be colour coded as per Indian Standard: 375-1951 & Indian Standard: 5-1978.

62. HAZARDOUS CHEMICALS.- The occupier of every factory involving hazardous process shall fill the Form 9 entitled 'Material Safety Data Sheet' and inform all employees of the factory, and the Competent Authority about the hazards involved. The Competent Authority may, on the basis of Material Safety Data Sheet mentioned above direct the Manager in writing to supply the workers exposed to particular hazard any necessary personal protective equipment conforming to relevant Indian Standards and prescribe the information and manner in which this information is to be passed on to the general public residing in the vicinity of the factory.

CHAPTER V
WELFARE

63. WASHING FACILITIES.-

- (1) There shall be provided and maintained, in every factory for the use of employed persons adequate and suitable facilities for washing which shall include soap and nail brushes or other suitable means of cleaning and the facilities shall be conveniently accessible and shall be kept in a clean and orderly condition.
- (2) Without prejudice to the generality of the foregoing provisions, the washing facilities shall include-
 - (a) a trough with taps or jets at intervals of not less than 60 cm.; or
 - (b) wash basins with taps attached there to; or
 - (c) taps on stand-pipes; or
 - (d) showers controlled by taps; or
 - (e) circular troughs of fountain type:

Provided that the Inspector may having regard to the needs and habits of the workers, fix the proportion in which the aforementioned types of facilities shall be installed.

- (3)
 - (a) Every trough and basin shall have a smooth, impervious surface and shall be fitted with a waste-pipe and plug.
 - (b) The floor or ground under and in the immediate vicinity of every trough, tap, jet, wash-basin, stand-pipe, and shower shall be so laid or finished as to provide a smooth impervious surface and shall be adequately drained.
- (4) For persons whose work involves contact with any injurious or noxious substance there shall be at least one tap for every fifteen persons, and for persons whose work does not involve such contact the number of taps shall be as prescribed in the Schedule given below.

SCHEDULE

Number of workers	Number of taps
(1)	(2)
Up to 20	1
21 to 35	2
36 to 50	3
51 to 150	4
151 to 200	5

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(1)	(2)
Exceeding 200 but not exceeding 500	5 plus one tap for every 50 or fraction of 50
Exceeding 500	11 plus one tap for every 100 or fraction there of 100
(5) If female workers are employed, separate washing facilities shall be provided and so enclosed or screened that the interiors are not visible from any place where persons of other sex work or pass. The entrance to such facilities shall bear conspicuous notice "For Women Only" in the language understood by the majority of the workers and shall also be indicated pictorially.	
(6) The water supply to the washing facilities shall be capable of yielding at least 27 litres a day for each person employed in the factory and shall be from a source approved in writing by the Medical Officer if the source of supply is not the same as for drinking water:	
Provided that where the Competent Authority is satisfied that such an yield is not practicable he may by certificate in writing permit the supply of a smaller quantity not being less than 5 litres per day for every person employed in the factory.	
64. FACILITIES FOR KEEPING CLOTHING.- All classes of factories mentioned in the Schedule to this rule shall provide facilities for keeping clothing not worn during working hours. Such facilities shall include the provision of arrangements approved by the Competent Authority. The Competent Authority shall have powers to add other factories under the Schedule given below:-	

SCHEDULE

Chemical works.

Engineering workshops.

Glass works.

Automobile workshops.

Power Plants.

5. FIRST-AID AND FIRST-AID APPLIANCES.- The first-aid oxes or cupboards shall be distinctively marked with a red cross on white background and shall contain the following equipments, namely :-

- (1) The manager of the factory shall lay down procedures for First-Aid and medical services

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so that injured or ill person receives prompt attention or aid. The person here means, a worker of the factory, contractor's labour or even a visitor.

- (2) For factories in which the number of persons employed does not exceed ten, or in the case of factories in which mechanical power is not used & the number of persons does not exceed fifty each first-aid box or cupboard shall contain the following equipments, namely:-
- (a) Six small size sterilised dressings.
 - (b) Three medium size sterilised dressings.
 - (c) Three large size sterilised dressings.
 - (d) Three large size sterilised burn dressings.
 - (e) One (60 ml) bottle of centrimide solution (1%) or a suitable antiseptic solution.
 - (f) One (60 ml) bottle of mercury chrome solution (2%) in water.
 - (g) One (30 ml) bottle containing sal-volatile having the dose and mode of administration indicated on the label.
 - (h) One pair of scissors.
 - (i) One roll of adhesive plaster (2 cm X 1 m).
 - (j) Six pieces of sterilised eye pads in separate sealed packets.
 - (k) A bottle containing 100 tablets (each of 325 mg) of aspirin or any other analgesic.
 - (l) Polythene wash bottle (1/2 litre, i.e. 500 cc) for washing eyes.
 - (m) A snake-bite lancet.
 - (n) One (30 ml) bottle containing potassium permanganate crystals.
 - (o) One tourniquet.
 - (p) A supply of suitable splints, and
 - (q) One copy of First-Aid leaflet issued by the Competent Authority.
- (3) For factories in which mechanical power is used and in which the number of persons employed exceeds ten but does not exceed fifty, each first-aid box or cupboard shall contain the following equipments, namely:-
- (a) Double of the quantity as indicated in respect of items (a) to (g) of sub-rule (2) above.
 - (b) Six (15 gms) packets of sterilized cotton wool.
 - (c) One pair of scissors.

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- (d) Two rolls of adhesive plaster (2 cm X 1 m).
 - (e) Eight pieces of sterilized eye pads in separate sealed packets.
 - (f) One tourniquet.
 - (g) A supply of suitable splints.
 - (h) One dozen safety pins.
 - (i) A bottle containing 100 tablets (each of 325 mg) of aspirin or any other analgesic.
 - (j) One polythene wash bottle (1/2 litre i.e., 500 cc) for washing eyes.
 - (k) A snake-bite lancet.
 - (l) One(30 ml) bottle containing potassium permanganate crystals.
 - (m) One copy of the first-aid leaflet issued by the Competent Authority.
- (4) For factories employing more than fifty persons, each First-Aid box or cupboard shall contain the following equipments, namely:-
- (a) Double of the quantity as indicated in respect of items (a) to (e) of sub-rule (2) above.
 - (b) One (200 ml) bottle of centrimide solution(1%) or a suitable antiseptic solution.
 - (c) One (200 ml) bottle of mercury chrome (2%) solution in water
 - (d) One (120 ml) bottle of sal-volatile having the dose and mode of administration indicated on the label.
 - (e) One pair of scissors.
 - (f) One roll of adhesive plaster (6 cm X 1 m).
 - (g) Two rolls of adhesive plaster (2 cm X 1 m).
 - (h) Twelve pieces of sterilized eye pads in separate sealed packets.
 - (i) A bottle containing 100 tablets (each of 325 mg) of aspirin or any other analgesic.
 - (j) One polythene wash bottle (500 cc) for washing eyes.
 - (k) Twelve roller bandages 10 cm wide.
 - (l) Twelve roller bandages 5 cm wide.
 - (m) Six triangular bandages.
 - (n) One tourniquet.
 - (o) A supply of suitable splints.

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- (p) Two packets of safety pins.
- (q) Kidney tray.
- (r) A snake-bite lancet.
- (s) One(30 ml) bottle containing potassium permanganate crystals.
- (t) One copy of first-aid leaflet issued by the Competent Authority:

Provided that items (j) to (q) inclusive, need not be included in the standard first-aid box or cupboard where there is a properly equipped ambulance room, or if at least one box containing such items placed and maintained in accordance with the requirements of section 45 is separately provided:

Provided further that the medical officer of the factory may alter the type and quantity of the contents at his discretion. The list of contents shall, however, be pasted inside the first aid box.

- (5) In lieu of the dressings required under items (a) and (b), these may be substituted by adhesive wound dressings approved by the Competent Authority and other equipment or medicines that may be considered essential and recommended by the Competent Authority from time to time.

66. NOTICE REGARDING FIRST-AID.- A notice containing the names of the persons working within the precincts of the factory who are trained in first-aid treatment and who are in charge of the first-aid boxes or cupboards shall be posted in every factory at a conspicuous place and near each such box or cupboard. The notice shall also indicate workroom where the said person shall be available. The name of the nearest hospital and its telephone number shall also be mentioned prominently in the said notice.

67. AMBULANCE ROOM.-

- (1) Every ambulance room shall be under the charge of at least one whole-time qualified medical practitioner (hereinafter referred to as medical officer) who shall be assisted by at least one qualified nurse or dresser-cum-compounder and one nursing attendant in each shift. The medical officer shall be readily available on call during working hours of the factory:

Provided that where a factory works in more than one shift, the Competent Authority, if it is satisfied that on account of the size of the factory, nature of hazards or frequency of accidents, it is necessary to employ a whole time medical officer for each shift separately, may, order so in writing.

- (2) There shall be displayed in the ambulance room a notice giving the name, address and telephone number of the medical practitioner in charge. The name of the nearest hospital and its telephone number shall also be mentioned prominently in the said notice.
- (3) No medical officer shall be required or permitted to do any work which is inconsistent with or detrimental to his responsibilities under this rule.

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- (4) The ambulance room shall be separate from the rest of the factory and shall be used only for the purpose of first-aid treatment and rest. It shall have a floor area of at least 24 sq.m. and smooth, hard and impervious walls and floors, and shall be adequately ventilated and lighted by both natural and artificial means. There shall be attached to it at least one latrine & urinal of sanitary type. An adequate supply of wholesome drinking water shall be laid on and the room shall contain at least the following, namely:-
- (a) A glazed sink with hot and cold water always available.
 - (b) A table with a smooth top at least 180 cm X 105 cm.
 - (c) Means for sterilizing instruments.
 - (d) A couch.
 - (e) Two stretchers.
 - (f) Two buckets or containers with close fitting lids.
 - (g) Two rubber hot water bags.
 - (h) A kettle and spirit stove or other suitable means of boiling water.
 - (i) Twelve plain wooden splints 900 mm X 100 mm X 6 mm.
 - (j) Twelve plain wooden splints 350 mm X 75 mm X 6 mm.
 - (k) Six plain wooden splints 250 mm X 50 mm X 12 mm.
 - (l) Six woolen blankets.
 - (m) Three pairs of artery forceps.
 - (n) One bottle of spiritus ammoniac aromaticus (120 ml)
 - (o) Smelling salts (60 gm).
 - (p) Two medium size sponges.
 - (q) Six hand towels.
 - (r) Four "Kidney" trays.
 - (s) Four cakes of toilet, preferably antiseptic soap.
 - (t) Two glass tumblers and two wine glasses.
 - (u) Two clinical thermometers.
 - (v) Two tea spoons.
 - (w) Two graduated (120 ml) measuring glasses.
 - (x) Two minim measuring glasses.
 - (y) One wash bottle (1000 cc) for washing eyes.

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- (z) One bottle (one litre) carbolic lotion 1 in 20.
 - (aa) Three chairs.
 - (bb) One screen.
 - (cc) One electric hand torch.
 - (dd) Four first-aid boxes or cupboards stocked to standards prescribed under(c)of rule 59.
 - (ee) An adequate supply of anti-tetanus toxiod.
 - (ff) Injections - morphia, pethidine, atropine, adrenaline, coramine, novocain (6 each).
 - (gg) Coramine liquid (60 ml).
 - (hh) Tablets -25 each of antihistaminic, antispasmodic.
 - (ii) Syringes with needles - 2 cc, 5 cc, 10 cc and 50 cc.
 - (jj) Three surgical scissors.
 - (kk) Two needle holders, big and small.
 - (ll) Suturing needles and materials.
 - (mm) Three dissecting forceps.
 - (nn) Three dressing forceps.
 - (oo) Three scalpels.
 - (pp) One stethoscope.
 - (qq) Rubber bandage - pressure bandage.
 - (rr) Oxygen cylinder with necessary attachments.
- (5) The occupier of every factory to which these rules apply shall for the purpose of removing serious cases of accidents or sickness, provide in the premises and maintain in good condition a suitable conveyance unless he has made arrangements for obtaining such a conveyance from a hospital.
- (6) The Competent Authority may, by an order in writing exempt any factory from the requirements of this rule, subject to such conditions as it may specify in that order, if a hospital, ambulance room or dispensary is maintained at or within 200 m. of the precincts of the factory and such arrangements are made as to ensure the immediate treatment of all injuries sustained by workers within the factory and for providing rest to the workers so injured.

Explanation:- For the purpose of this rule, "qualified medical practitioner" means a person holding a qualification granted by an authority specified in the schedule to the Indian Medical Degrees Act, 1916 (7 of 1916), or in the schedules to the Indian Medical Council Act, 1956 (102 of 1956).

Rules -68

68. CANTEENS.-

- (1) The occupier of every factory where in more than two hundred and fifty workers are ordinarily employed shall provide in or near factory an adequate canteen according to standard prescribed in these rules.
- (2) The canteen building shall be situated not less than 15 meters from any boiler house, coal stacks, ash dumps and any other source of dust, smoke or obnoxious fumes:

Provided that the Competent Authority may in any particular factory relax the provisions of this sub-rule to such an extent as may be reasonable in the circumstances and may require measures to be adopted to secure the essential purpose of this sub-rule.

- (3) The canteen building shall be constructed in accordance with the plans and shall accommodate at least a dining hall, kitchen, store room, pantry and washing places separately for workers and for utensils.
- (4) In a canteen the floor and inside walls up to a height of 1.2 metres from the floor shall be made of smooth and impervious material; the remaining portion of the inside walls shall be made smooth by cement plaster or in any other manner.
- (5) The doors and windows of a canteen building shall be of flyproof construction and shall allow adequate ventilation.
- (6) The canteen shall be sufficiently lighted at all times when any persons have access to it.
- (7) (a) In every canteen -
 - (i) all inside walls of rooms and all ceilings and passages and staircases shall be limewashed or colourwashed at least once in each year or painted once in three years dating from the period when last limewashed, colourwashed or painted, as the case may be;
 - (ii) all wood work shall be varnished or painted once in three years dating from the period when last varnished or painted; and
 - (iii) all internal structural iron or steel work shall be varnished or painted once in three years dating from the period when last varnished or painted:

Provided that inside walls of the kitchen shall be limewashed once every four months.
- (b) Records of dates on which lime washing, colourwashing, varnishing or painting is carried out shall be maintained in the prescribed register (Form 2).
- (8) The precincts of the canteen shall be maintained in a clean and sanitary condition. Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance. Suitable arrangements shall be made for the collection and disposal of garbage.

Rules 69-71

69. DINING HALL.-

- (1) The dining hall shall accommodate at a time at least 30 per cent of the workers working at a time and shall be provided with adequate numbers of tables and chairs or benches:

Provided that, in any particular factory or in any particular class of factories, the Competent Authority may by a notification in this behalf alter the percentage of workers to be accommodated.

- (2) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs, shall be not less than 1 sq.m per diner to be accommodated as prescribed in sub-rule (1).
- (3) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number. Washing places for women shall be separate and screened to secure privacy.

70. EQUIPMENT.-

- (1) There shall be provided and maintained sufficient utensils, crockery, cutlery, furniture and any other equipment necessary for the efficient running of the canteen. Suitable clean clothes for the employees serving in the canteen shall also be provided and maintained.
- (2) The furniture, utensils and other equipment shall be maintained in a clean and hygienic condition. A service counter, if provided, shall have a top of smooth and impervious material. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipment.

71. ANNUAL MEDICAL EXAMINATION.-

- (1) Annual medical examination for fitness of each member of the canteen staff who handles foodstuffs shall be carried out by the factory medical officer or the Certifying Surgeon, which should include the following, namely:-
- (a) routine blood examination;
 - (b) routine and bacteriological testing, of faeces and urine for germs of dysentery and typhoid fever; and
 - (c) any other examination including chest X-ray that may be considered necessary by the factory medical officer or the Certifying Surgeon.
- (2) Any person who in the opinion of the factory medical officer or the certifying surgeon is unsuitable for employment on account of possible risk to the health of others, shall not be employed as canteen staff.

Rule 72

72. SHELTERS, REST ROOMS AND LUNCH ROOMS.-

(1) The shelters, or rest rooms and lunch rooms shall conform to the following standards, namely:-

- (a) the building shall be soundly constructed and all the walls and roof shall be of suitable heat resisting materials and shall be water-proof. The floor and walls to a height of 90 cm. shall be so laid or finished as to provide a smooth, hard impervious surface;
- (b) the height of every room in the building shall be not less than 3.70 m from floor level to the lowest part of the roof and there shall be at least 1.10 sq.m of floor area for every person employed:

Provided that (i) workers who habitually go home for their meals during the rest periods may be excluded in calculating the number of workers to be accommodated, and (ii) in the case of factories in existence at the date of commencement of the Act, where it is impracticable owing to lack of space to provide 1.10 sq.m. of floor area for each person, such reduced floor area per person shall be provided as may be approved in writing by the Competent Authority;

- (c) effective and suitable provision shall be made in every room for securing and maintaining adequate ventilation by the circulation of fresh air and there shall also be provided and maintained sufficient and suitable natural or artificial lighting;
- (d) every room shall be adequately furnished with chairs or benches with back-rest; and
- (e) sweepers shall be employed whose primary duty it is to keep the rooms, building and precincts thereof in a clean and tidy condition.
- (f) suitable provision shall be made in every room for supply of drinking water and facilities for washing.

(2) The lunch rooms shall -

- (a) comply with the requirements laid down in clauses (a) to (f) of sub-rule (1), and
- (b) be provided with adequate number of tables with impervious tops for the use of workers for taking food:

Provided that the Competent Authority may exempt any factory from the provisions of this rule subject to the provisions being complied by some other means.

Rules 73-74

73. CRECHES.-

- (1) The creche shall be conveniently accessible to the mothers of the children accommodated therein and so far as is reasonably practicable it shall not be situated in close proximity to any part of the factory where obnoxious fumes, dust or odours are given off or in which excessively noisy processes are carried on.
- (2) The building in which the creche is situated shall be soundly constructed and all the walls and roof shall be of suitable heat resisting materials and shall be water-proof. The floor and internal walls of the creche shall be so laid or finished as to provide a smooth impervious surface.
- (3) The height of the rooms in the building shall be not less than 3.70 m from the floor to the lowest part of the roof and there shall be not less than 2.00 sq.m of floor area for each child to be accommodated.
- (4) Effective and suitable provision shall be made in every part of the creche for securing and maintaining adequate ventilation by the circulation of fresh air.
- (5) The creche shall be adequately furnished and equipped and in particular there shall be one suitable cot or cradle with the necessary bedding for each child (provided that for children over two years of age it will be sufficient if suitable bedding is made available), at least one chair or equivalent seating accommodation for the use of each mother while she is feeding or attending to her child, and a sufficient supply of suitable toys for the older children.
- (6) A suitably fenced and shady open air playground shall be provided for the older children:

Provided that the Competent Authority may by order in writing exempt any factory from compliance with this sub-rule if he is satisfied that there is not sufficient space available for the provision of such a play-ground.

74. WASHROOM.-

- (1) There shall be in or adjoining the creche a suitable washroom for the washing of the children and their clothing. The washroom shall conform to the following standards, namely:-
 - (a) the floor and internal walls of the room to a height of 90 cm. shall be so laid or furnished as to provide a smooth impervious surface. The room shall be adequately lighted and ventilated and the floor shall be effectively drained and maintained in a clean and tidy condition;
 - (b) there shall be at least one basin or similar vessel for every four children accommodated in a creche at any one time together with a supply of water provided, if practicable, through taps from a source approved by the Health Officer. Such source shall be capable of yielding for each child a supply of at least 23 litres of water a day; and
 - (c) an adequate supply of clean clothes, soap and clean towels shall be made available for each child while it is in the creche.

Rules 74-77

- (b) there shall be at least one basin or similar vessel for every four children accommodated in a creche at any one time together with a supply of water provided, if practicable, through taps from a source approved by the Health Officer. Such source shall be capable of yielding for each child a supply of at least 23 litres of water a day; and
 - (c) an adequate supply of clean clothes, soap and clean towels shall be made available for each child while it is in the creche.
- (2) Adjoining the washroom referred to in sub-rule (1), a latrine shall be provided for the sole use of the children in the creche. The design of latrine and the scale of accommodation to be provided shall either be approved by the Public Health authorities or, where there is no such Public Health authority, by the Competent Authority.
- 75. SUPPLY OF MILK AND REFRESHMENT.**-At least a quarter litre of clean pure milk shall be available for each child on every day if accommodated in the creche and the mother of such a child shall be allowed in the course of her daily work, four intervals of at least 15 minutes to feed the child. For children above two years of age there shall be provided in addition an adequate supply of wholesome refreshment.
- 76. CRECHE STAFF.**- For each creche there shall be appointed a woman in-charge and an adequate number of female attendants to help the woman in-charge. No woman in-charge shall be appointed under this rule unless she possesses the qualifications prescribed for a midwife or produces a certificate that she has undergone training for a period of not less than 18 months in a hospital, maternity home or nursing home approved in this behalf by the Competent Authority or produces a certificate that she has received training for a pre-primary teacher in an institution approved by the State Government. The creche staff shall be provided with suitable clean clothes for use while on duty in the creche.
- 77. EXEMPTION FROM THE PROVISION OF CRECHE.**-
 - (1) In factories where the number of married women or widows employed does not exceed 15 or where the factory works for less than 180 days in a calendar year, or where number of children kept in the creche was less than 5 in the preceding year, the Competent Authority may exempt such factories from the provisions of section 48 and the rules 73 to 76 made thereunder, if he is satisfied that alternate arrangements as stipulated under subrule (2) are provided by the factory.
 - (2)
 - (a) The alternate arrangements required in sub-rule (1) shall include a creche building which has a minimum accommodation at the rate of 1.90 sq. m. per child and constructed in accordance with the plans approved by the Competent Authority.
 - (b) The creche building shall have -
 - (i) a suitable washroom for washing of the children and their clothing;
 - (ii) adequate supply of soap and clean clothes and towels; and
 - (iii) adequate number of female attendants who are provided with suitable clean clothes for use while on duty to look after the children in the creche.
 - (3) The exemption granted under sub-rule (1) may at any time be withdrawn by the Competent Authority if it finds after such enquiry as he may deem fit, that the factory has committed a breach of this rule.

Rules -78

78. WELFARE OFFICER.-

(1) Number of Welfare Officers.-

- (a) The occupier of every factory employing between five hundred(500) and two thousand (2000) workers shall appoint at least one Welfare Officer, and where the number of workers exceeds 2000, there shall be an additional Welfare Officer for every additional 2000 workers or fraction thereof over 500. In a factory where both men and women workers are employed, the number of women Welfare Officers to be appointed shall be in proportion to the women workers employed provided that where the number of women employed is more than 100 and the total number of workers does not exceed 2500 an additional woman Welfare Officer shall be appointed.
- (b) Where there are more than one Welfare Officer appointed, one of them shall be called the Chief Welfare Officer and the others Assistant Welfare Officers.

(2) Qualifications.- A person shall not be eligible for appointment as a Welfare Officer, unless he -

- (a) possesses a degree of a University recognised by the Government in this behalf;
- (b) has obtained a degree or diploma in social science with specialization in industrial relations from any institution recognised by the Government in this behalf; and
- (c) has adequate knowledge of the language spoken by the majority of the workers in the factory to which he is to be attached:

Provided that the Competent Authority, may by notification grant exemption from the provisions of clause (b) in suitable cases till such time as qualified persons are available:

Provided further that, in the case of a person who is acting as a Welfare Officer at the commencement of these rules, the Competent Authority may, subject to such conditions as it may specify, relax all or any of the aforesaid qualifications.

(3) Appointment of Welfare Officers.-

- (a) The appointment of welfare officers shall be done as per the extant government procedures.
- (b) The appointment when made shall be notified by the occupier to the Competent Authority or such authority as the Competent Authority may specify for the purpose, giving full details of the qualifications, etc. of the officer appointed and the conditions of his service.

(4) Conditions of service of Welfare Officers.-

- (a) A Welfare Officer shall be given appropriate status corresponding to the status of the other executive heads of the factory and he shall be started on a suitable scale of pay equivalent to that of group B officer, the minimum of which shall not be less than Rs.2000/- per month.

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- (b) The conditions of service of a Welfare Officer shall be the same as of other members of the staff of corresponding status in the factory.
- (5) Duties of Welfare Officer.- The duties of a Welfare Officer shall be -
 - (a) to establish contacts and hold consultations with a view to maintaining harmonious relations between the factory management and workers;
 - (b) to bring to the notice of the factory management the grievances of workers, individual as well as collective, with a view of securing their expeditious redress and to act as a liaison officer between the management and labour;
 - (c) to study and understand the point of view of labour in order to help the factory management to shape and formulate labour policies and to interpret these policies to the workers in a language they can understand;
 - (d) to watch industrial relations with a view of using his influence in the event of a dispute between the factory management and workers and to help to bring about a settlement by persuasive effort;
 - (e) to advise on fulfillment by the management and the concerned departments of the factory of obligations, statutory or otherwise, concerning regulation of working hours, maternity benefit, medical care, compensation for injuries and sickness and other welfare and social benefit measures;
 - (f) to advise and assist the management in the fulfillment of its obligations, statutory or otherwise, concerning prevention of personal injuries and maintaining a safe work environment, in such factories where a Safety Officer is not required to be appointed under the enabling provisions under section 40 B;
 - (g) to promote relations between the concerned departments of the factory and workers which will bring about productive efficiency as well as amelioration in the working conditions and to help workers to adjust and adapt themselves to these working environments;
 - (h) to encourage the formation of Works and Joint Production Committees, Co-operative Societies and Welfare Committee, and to supervise their work;
 - (i) to encourage provision of amenities such as canteens, shelters for rest, creches, adequate latrine facilities, drinking water, sickness and benevolent scheme payments, pension and superannuation funds, gratuity payments, granting of loans and legal advice to workers;
 - (j) to help the factory management in regulating the grant of leave with wages and explain to the workers the provisions relating to leave with wages and other leave privileges and to guide the workers in the matter of submission of application for grant of leave for regulating authorised absence;
 - (k) to advise on provision of welfare facilities, such as housing facilities, foodstuffs, social and recreational facilities, sanitation, advice on individual personnel problems and education of children;

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- (l) to advise the factory management on questions relating to training of new starters, apprentices, workers on transfer and promotion, instructors and supervisors, supervision and control of notice board and information bulletins to further education of workers and to encourage their attendance at technical institutes; and
 - (m) to suggest measures which will serve to raise the standard of living of workers and in general promote their well- being.
- (6) Welfare Officers not to deal with disciplinary cases or appear on behalf of the management against workers.- No Welfare Officer shall deal with any disciplinary cases against workers or appear before a conciliation officer in a court or tribunal on behalf of the factory management against a worker or workers.
- (7) Powers of exemption.- The Competent Authority may, by notification exempt any factory or class or description of factories from the operation of all or any of the provisions of this chapter, subject to compliance with such alternative arrangements as may be approved by such Competent Authority.

Rule 88 (Sch. -X)

SCHEDULE X

FINISHING BY ABRASIVES PROPELLED BY COMPRESSED AIR/STEAM

Cleaning or Smoothing, Roughening, etc., of Articles, by a Jet of Sand, Metal Shot, or Grit, or other Abrasive Propelled by a Blast of Compressed Air or Steam:

1. Definition.- For the purposes of this Schedule
 - (a) "blasting" means cleaning, smoothing, roughening, or removing of any part of the surface of any article by the use as an abrasive of a jet of sand, metal shot, or grit or other material, propelled by a blast of compressed air or steam;
 - (b) "blasting enclosure" means a chamber, barrel, cabinet or any other enclosure designed for the performance of blasting therein;
 - (c) "blasting chamber" means a blasting enclosure in which any person may enter at any time in connection with any work or otherwise; and
 - (d) "cleaning of castings" where done as an incidental or supplemental process in connection with the making of metal castings, means the freeing of the casting from adherent sand or other substance and includes the removal of cores and the general smoothing of a casting, but does not include the free treatment.
2. Prohibition of sand blasting.- Sand or any other substance containing free silica shall not be introduced as an abrasive into any blasting apparatus and shall not be used for blasting:

Provided further that no woman shall be employed or permitted to work at any operation of sand blasting.
3. Precautions in connection with blasting operations.-
 - (a) Blasting shall not be done except in a blasting enclosure and no work other than blasting and any work immediately incidental thereto and clearing and repairing of the enclosure including the plant and appliances situated therein, shall be performed in a blasting enclosure. Every door, aperture and joint of blasting enclosure, shall be kept closed and air-tight while blasting is being done therein.
 - (b) Blasting enclosure shall always be maintained in good condition and effective measures shall be taken to prevent dust escaping from such enclosure, and from apparatus connected therewith, into the air of any room.
 - (c) There shall be provided and maintained for and in connection with every blasting enclosure, efficient apparatus for separating, so far as practicable, abrasive which has been used for blasting and which is to be used again as an abrasive, from dust or particles of other materials arising from blasting; and no such abrasive shall be introduced into any blasting apparatus and used for blasting until it has been so separated:

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Provided that this clause shall not apply, except in the case of blasting chambers, to blasting enclosures constructed or installed before the coming into force of this schedule, if the Competent Authority is of opinion that it is not reasonably practicable to provide such separating apparatus.

- (d) There shall be provided and maintained in connection with every blasting enclosure efficient ventilating plant to extract, by exhaust draught effected by mechanical means, dust produced in the enclosure. The dust extracted and removed shall be disposed of by such method and in such manner that it shall not escape into the air of any room; and every other filtering or settling device situated in a room in which persons are employed, other than persons attending to such bag or other filtering or settling device, shall be completely separated from the general air of that room in an enclosure ventilated to the open air.
- (e) The ventilating plant provided for the purpose of sub-paragraph (d) shall be kept in continuous operation whenever the blasting enclosure is in use whether or not blasting is actually taking place therein, and in the case of a blasting chamber, it shall be in operation even when any person is inside the chamber for the purpose of cleaning.

4. Inspection and examination.-

- (a) Every blasting enclosure shall be specially inspected by a competent person at least once in every week in which it is used for blasting enclosure, the apparatus connected therewith and the ventilating plant shall be thoroughly examined and in the case of ventilating plant, tested by a competent person at least once in every month.
- (b) Particulars of the result of every such inspection, examination or test shall forthwith be entered in a register which shall be kept in Form 10 and shall be available for inspection by any workman employed in or in connection with blasting in the factory. Any defect found on any such inspection, examination or test this paragraph applies shall be deemed for the purposes of this Paragraph to have been constructed, reconstructed or converted for use as such after the making of this Schedule if the construction, reconstruction or conversion thereof was begun after the making of this Schedule.

5. Provision of protective helmets, gauntlets and overalls.-

- (a) There shall be provided and maintained for the use of all persons who are employed in a blasting chamber, whether in blasting or in any work connected therewith or in cleaning such a chamber, protective helmets of a type approved by a certificate of the Competent Authority; and every such person shall wear the helmet provided for this use whilst he is in the chamber and shall not remove it until he is outside the chamber.
- (b) Each protective helmet shall carry a distinguishing mark indicating the person by whom it is intended to be used and no person shall be allowed or required to wear a helmet not carrying his mark or a helmet which has been worn by another person and has not since been thoroughly disinfected.

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- (c) Each protective helmet when in use shall be supplied with clean and not unreasonably cold air at a rate of not less than 170 litres per minute.
 - (d) Suitable gauntlets and overalls shall be provided for the use of all persons while performing blasting or assisting at blasting, and every such person shall while so engaged, wear the gauntlet and overall provided.
- 6. Precautions in connection with cleaning and other work -
 - (a) Where any person is engaged upon cleaning of any blasting apparatus or blasting enclosure or of any apparatus or ventilating plant connected therewith or the surroundings thereof or upon any other work in connection with any blasting apparatus or blasting enclosure or with any apparatus or ventilating plant connected therewith so that he is exposed to the risk of inhaling dust which has arisen from blasting, all practicable measures shall be taken to prevent such inhalation.
 - (b) In connection with any cleaning operation referred to in paragraph 5, and with the removal of dust from filtering or settling devices all practicable measures shall be taken to dispose of the dust in such a manner that it does not enter the air of any room. Vacuum cleaners shall be provided and used wherever practicable for such cleaning operations.
- 7. Storage accommodation for protective wear.- Adequate and suitable storage accommodation for the helmets, gauntlets and overalls required to be provided by paragraph 5 shall be provided outside and conveniently near to every blasting enclosure and such accommodation shall be kept clean. Helmets and overalls when not in actual use shall be kept in this accommodation.
- 8. Maintenance and cleaning of protective wear.- All helmets, gauntlets, overalls and other protective devices or clothings provided and worn for the purposes of this schedule, shall be kept in good condition and so far as is reasonably practicable shall be cleaned on every weekday in which they are used. Where dust arising from the cleaning of such protective clothing or devices is likely to be inhaled, all practicable measures shall be taken to prevent such inhalation. Vacuum cleaners shall, wherever practicable, be used for removing dust from such clothing and compressed air shall not be used for removing dust from any clothing.
- 9. Maintenance of vacuum cleaning plant.- Vacuum cleaning plant used for the purpose of this schedule shall be properly maintained.
- 10. Medical facilities and records of examinations and tests.-
 - (a) The occupier of every factory to which the Schedule applies, shall
 - (i) employ a qualified medical practitioner for medical surveillance of the workers employed therein, and whose

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employment shall be subject to the approval of the Competent Authority;
and

- (ii) provide to the said medical practitioner all the necessary facilities for the purpose referred to in clause (i) above.
- (b) The record of medical examinations and appropriate tests carried out by the said medical practitioner shall be maintained in a separate register approved by the Competent Authority which shall be kept readily available for inspection by the Inspector.

11. Medical examination by Certifying Surgeon.-

- (a) Every worker employed in any of the processes to which this schedule applies shall be examined by a Certifying Surgeon within 15 days of his first employment. Such examination shall include pulmonary function test and chest X-ray. No worker shall be allowed to work after 15 days of his first employment in the factory unless certified fit for such employment by the Certifying Surgeon.
- (b) Every worker employed in the said processes shall be re-examined by a Certifying Surgeon at least once in every 12 calendar months and such re-examination shall, wherever the Certifying Surgeon considers appropriate, include pulmonary function test and chest X-ray once in every three years.
- (c) The Certifying Surgeon after examining a worker, shall issue a Certificate of Fitness in Form 1. The record of examination and re-examinations carried out shall be entered in the Certificate and the Certificate shall be kept in the custody of the manager of the factory. The record of each examination carried under subparagraphs (a) and (b), including the nature and the results of the tests, shall also be entered by the Certifying Surgeon in a health register in Form 1A.
- (d) The Certificate of Fitness and the health register shall be kept readily available for inspection by the Competent Authority.
- (e) If at any time the Certifying Surgeon is of the opinion that a worker is no longer fit for employment in the said processes on the ground that continuance therein would involve special danger to the health of the worker, he shall make a record of his findings in the said certificate and the health register. The entry of his findings in those documents shall also include the period for which he considers that the said person is unfit for work in the said processes. The person so suspended from the process shall be provided with alternate placement facilities unless he is fully incapacitated in the opinion of the Certifying Surgeon, in which case the person affected shall be suitably rehabilitated.
- (f) No person who has been found unfit to work in the said processes as said in subparagraph (e) above shall be reemployed or permitted to work unless the Certifying Surgeon, after further examination, again certifies him fit for employment in those processes.

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12. Power to exempt or relax.-

- (a) If the Competent Authority is satisfied that in any factory or any class of factories, the use of sand or other substance containing free silica as an abrasive in blasting is necessary for a particular manufacture or process (other than the process incidental or supplemental to making of metal castings) and that the manufacture or process cannot be carried on without the use of such abrasive or that owing to the special conditions or special method of work or otherwise any requirement of this schedule can be suspended either temporarily or permanently, or can be relaxed without endangering the health of the persons employed or that application of any of such requirements is for any reason impracticable or inappropriate, it may, with the previous sanction of the Central Government, by an order in writing exempt the said factory or class of factories from such provisions of this schedule, to such an extent and subject to such conditions and for such period as may be specified in the said order.
- (b) Where an exemption has been granted under sub-paragraph (a), a copy of the order shall be displayed at a notice board at a prominent place at the main entrance or entrances to the factory and also at the place where the blasting is carried on.

89. NOTIFICATION OF ACCIDENTS.-

- (1) Where any accident specified in sub-para (a) of para 1 of the Schedule to this rule or any occurrences specified in para 2 of the said schedule takes place in a factory, the Manager of the factory, in which the accident occurred, shall within four hours of the happening of such accident or occurrence, send notice thereof in Form 11 by telephone, telex, telegram or special messenger to the inspector and the Competent Authority and when the accident is fatal or it is of such a nature that it is likely to prove fatal, notice as aforesaid shall also be sent to-
 - (a) the District Magistrate or sub Divisional Magistrate;
 - (b) the Officer In Charge of the nearest Police Station;
 - (c) the Electrical Inspector (In case of electrical accident); and
 - (d) the relatives of the injured or deceased person.
- (2) The notice so given shall be confirmed by the Manager of the factory to the above mentioned authorities within 12 hours of the accident/occurrence by sending a written report in Form 12 and in case of electrical accidents in Form 13 to the Electrical Inspector.
- (3) When any accident of a minor nature specified in sub-para (b) of the said para 1 of the schedule takes place in a factory, the Manager of the factory shall within 24 hours after the expiry of the period specified in the said sub-para (b) , send notice thereof in the Form 11 to the medical officer; & the Competent Authority.

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- (4) If, in case of an accident, the injured person subsequently dies due to such accident, information of his death whenever known shall be sent by the Manager of the factory by telephone, telex, telegram or special messenger within 24 hours of the occurrence to-
- (a) the District Magistrate or Sub-Divisional Magistrate;
 - (b) the Officer In Charge of the nearest Police Station;
 - (c) the Competent Authority; and
 - (d) the Electrical Inspector (In case of Electrical accidents).

EXPLANATION: Accident of serious nature means an accident which results in either or all of the following, namely:-

- (i) Immediate loss of any part of the body or any limb or part thereof;**
 - (ii) Crushed or Serious injury to any part of the body due to which loss of the same is obvious or any injury which is likely to prove fatal;**
 - (iii) Unconsciousness;**
 - (iv) Severe burns or scalds due to chemicals, steam or any other cause; and**
 - (v) Any injury to man/animal due to electrical energy.**
- (5) The Manager of the factory shall lay down the procedures for investigation of all accidents and occupational illnesses reported as per Forms 12 and 14.

SCHEDULE

1.
 - (a) Accidents which cause death to any person or are of a serious nature.
 - (b) Accidents which cause such bodily injury as prevents or will probably prevent the person injured from working for a period of 48 hours or more immediately following the accident.
2. The following classes of occurrences, whether or not they are attended by personal injury or disablement:-
 - (a) Bursting of a vessel used for containing steam under pressure greater than atmospheric pressure, other than plant which comes within the scope of the Indian Boilers Act.
 - (b) Collapse or failure of a crane, derrick, winch, hoist or other appliances used in raising or lowering persons or goods or any part thereof, or the overturning of a crane.
 - (c) Explosion, fire, bursting out, leakage or escape of any molten metal, or hot liquor or gas causing bodily injury to any person or damage to any room or place in which persons are employed.

Rules 89(Sch.)-102

- (d) Explosion of a receiver or container used for the storage at a pressure greater than atmospheric pressure of any gas or gases(including air) or a liquid or solid resulting from the compression of gas.
 - (e) Collapse or subsidence of any floor, gallery, roof, bridge, tunnel, chimney, wall or building, forming part of a factory or within the compound or curtilage of factory.
3. Leakage or release of effluents to the outside environment above those specified by the Department of Environment and Air and Water Pollution Control Boards.
- 90. NOTICE OF POISONING OR DISEASE. - A notice in Form 14 shall be sent with in four hours to the Competent Authority by the manager of the factory in which there occurs a case of poisoning or disease due to items mentioned in the Third Schedule of section 45 of the Factories Act, 1948(63 of 1948).**
- 98. REGISTER OF ACCIDENTS AND DANGEROUS OCCURRENCES. - The manager of every factory shall maintain a register of all accidents and dangerous occurrences which occur in the factory. All these shall be investigated thoroughly and causes established. Any deficiency found in respect of systems & practices shall be corrected & report thereof shall be made available to the inspector & Competent Authority.**
- 99. MAINTENANCE OF INSPECTION BOOK.- The manager of every factory shall maintain a register of inspection reports and shall produce it when so required by the Competent Authority or Certifying Surgeon.**
- 101. COMMUNICATION FACILITIES.- The Manager shall establish effective communication facilities so that in the normal as well as in emergency conditions the Shift-in-charge is able to contact without delay the factory manager, control room, security, fire station, dispensary, workers and the outside agencies such as police, fire brigade, hospital, district magistrate, civil defence post.**
- 102. SPECIAL POWERS OF THE COMPETENT AUTHORITY.- The Competent Authority shall have powers to notify specific safety procedures, guides, manuals to enhance safety & health in any factory.**

Form - 1

CERTIFICATE OF FITNESS TO WORK ON SPECIFIED JOB

(See rules 7(3), 32 Sch. III, 33, 55, 88)

1. Name of the Factory:
2. Name of the Person
(In Block letters) and Employee No.
Sex: M/F Date of birth:
3. Educational Qualifications:
4. Previous Experience :
Field of Experience :
5. Details of Medical Examination : Date
 - .1. Height..... .cm. .2. Weight..... .kg.
 - .3. Hearing (Auditory Examination): Normal/Not normal*
 - .4. Eyesight : Normal/Normal with specs/Not normal*

: Colour blindness : Yes/No
 - .5. General Laboratory Investigations (Blood, urine, excreta, sputum etc.):
Normal/Not normal*
 - .6. Pulmonary function & Chest Examination : Normal/Not normal*
(including X ray examination)
 - .7. Nervous system: Normal/Not normal*
 - .8. Overall health assessment:

* Specify the condition & remedial measures.

(2)

6. I certify that I have personally examined Dr./Shri/Smt./Kum.. and seen his/her other medical reports and my recommendations are recorded below.

7.	Work with/in/at	Recommendations
.1.	Chemicals and hazardous materials including prescribed materials	Fit/Unfit
.2.	Machines	
.2.1	Cranes	Fit/Unfit
.2.2	Locomotives	Fit/Unfit
.2.3	Fork lifts	Fit/Unfit
.3.	Blasting by compressed air/steam for cleaning of articles.	Fit/Unfit
.4.	Radioactive Area	Fit/Unfit
.5.	Any other work specified by the Competent Authority...	Fit/Unfit

Signature of Certifying Surgeon

Name

Date:

Reg.No. ..

Note: Strike out whichever is not applicable.

Medical Examination Record

S.No.	Date of		Remarks
-----	-----	-----	-----
	Last Examination	Next Examination	

HEALTH REGISTER OF WORKERS EMPLOYED ON SPECIFIED JOBS**(See rules 7(4), 88)**

Name of the Factory:

S.No.	Name	Age Yrs.	Nature of job	Medical Exam.	Date of Employment in present work	Learning or transfer to other work	If suspended from work period of suspension	Date of resumption of duty	Signature with date of certifying surgeon

N.B. Against column Nature of job please write the applicable number as given below:

- (1) Working with Chemicals & Hazardous materials.
- (2) Working with-2.1 rotating machines; 2.2 lifting machines; 2.3 material handling equipment.
- (3) Working with -3.1 electrical work-low & medium voltage; 3.2 electrical work-high voltage.
- (4) At height.
- (5) At blasting by compressed air/steam for cleaning of articles.
- (6) Radioactive area.

Form - 3**REPORT OF EXAMINATION OF HOISTS & LIFTS****(See Rule 34)**

1. Name of the Factory :
- 2.1 Type of hoist or lift and identification No. or description :
- 2.2 Date of construction/reconstruction :
3. Are all parts of the hoist or lift, of good mechanical :
: construction, sound material and adequate strength
(so far as ascertainable)
4. Are the following parts of the hoist or lift properly :
maintained and in good working order? If not, state
what defects have been found.
 - .1. Enclosure of hoistway or liftway :
 - .2. Landing gates and cage gate(s) :
 - .3. Interlocks and the landing gates and cage :
gate(s)
 - .4. Other gate fastenings :
 - .5. Cage and platform and fittings, guides, :
buffers, interior of the hoistway or liftway.
 - .6. Overrunning devices :
 - .7. Suspension ropes or chain and their :
attachments.
 - .8. Safety gear i.e. arrangement for preventing :
fall of platform or cage brakes.
 - .9. Brakes :
 - .10. Worm or spur gearing :
 - .11. Other electrical equipment :
 - .12. Other parts :
5. What parts(if any) were inaccessible :
6. Repairs, renewals :
7. Maximum safe work load :

(2)

8. Is any of the lift made as per requirements of fire lift & if so its location & identification No. :
9. Other particulars :

I/we certify that on (date) I/we thoroughly examined this hoist or lift and that the above is a correct report of the result.

Signature:

Date:

Name :

REPORT OF EXAMINATION OF LIFTING MACHINES

Ropes & Lifting Tackles

(See rule 35(4))

1. Name of the Factory :
2. Distinguishing number or mark (if any) and description sufficient to identify the lifting machine, chains, rope or lifting tackle. :
3. Date when lifting machine chain, rope or lifting tackle was first used in the factory. :
4. Date and number of certificate of last examination made under section 29(1)a (iii) and by whom it was carried out. :
5. Date and number of certificate relating to any test & examination made, under rules 35.1 & 35.15 together with the name & address of the certifying person. :
6. Date & certificate of annealing or other heat treatment of the chain and lifting tackle carried out as per rule 35.7 and by whom it was carried out. :
7. Particulars of any defect found at any such examination or after annealing and affecting the safe working load and steps taken to remedy such defect. :

I/We certify that on I/We thoroughly examined the above mentioned lifting machine/chain rope/lifting tackle and that the above is a correct report of the result.

Signature:

Date:

Name:

ITEM FIELD PERFORMANCE REPORT**(See rule 60)**

1.	Name of the Factory	:
2.	Item	:
.1	Identification	:
.2	Manufacturer	:
.3	Number of items of the type	:
.4	Date of manufacture	:
.5	Date of modification/reconditioning	:
.6	Date first placed in use	:
.7	Cumulative operating time since above	:
.8	Date & place where used after 2.5	:
.9	Date/ cumulative operating time since above	:
.10	Cumulative time-Non use (Storage/Maintenance)	:
4.	Operating environment	:
.1	Temperature Range	:
.2	Relative humidity range	:
.3	Nature of atmosphere A.C./Clean/Dusty/Corrosive/...	:
.4	Vibration level	:
5.	Mode of operation Continuous/Intermittent/Standby/...	:

(2)

- 6. Item failure information :
 - .1 Symptoms of failure :
 - .2 Failure detected during Operation / Periodic check / Preventive maintenance :
 - .3 Functions affected by failure :
 - .4 Failure cause :
 - Inherent/Misuse/ Maintenance induced/ :
 - External to item/ Secondary/Unknown :
- 7. Item failure analysis and correction :
 - .1 List of failed parts :
 - .2 List of replaced parts :
 - .3 Adjustments made :
- 8. Total active downtime :
- 9. Total downtime :
- 10. Any other information :

Date:

Signature:

Name :

Designation:

FAILURE MODE, EFFECT & CRITICALITY ANALYSIS**[F M E C A]****(See rule 60)**

Name of the Factory:

System : ...

Sub System: ...

Page _____ of _____

Code No. : ...

No.	Part No.	Part		Failure Mode		Detection Method	Effect on System Plant	Remarks
		Name	Function	No.	Description			
1	2	3		4		5	6	7

Prepared By ...

Checked By ...

Approved By ...

Form - 11

PRELIMINARY REPORT OF ACCIDENT OR DANGEROUS OCCURRENCES

(See rules 89(1), 89(3))

1.

Name of the Factory

:
2.

Name of injured person & address

:

Official

:

Residential

:
3.

a) Sex : M/F

b) Age:

c) Designation :

d) Pay:
4.

Date and hours of accident/dangerous occurrence

:
5.

Cause & Nature of accident/dangerous occurrence

:

Date:

Manager

Signature:

Place:

Name :

1.

District/Sub Divisional Magistrate

In case of fatal accident or if it is of such a nature that it is likely to be
2.

Officer in charge of nearest police station
3.

Inspector concerned.
4.

Competent Authority.
5.

Relatives of the injured/deceased.
6.

Electrical Inspector.[In case of Electrical Accidents.]

NOTICE OF ACCIDENTS OR DANGEROUS OCCURRENCE**(See rules 89(2), 89(5))**

1. Name of the Factory :
2. Branch or section & exact place where the accident or dangerous occurrence happened :
3. Name of injured person :
Address :
Official :
Residential :
4. a) Sex : M/F b) Age :
c) Designation : d) Pay :
5. Date and hour of accident or dangerous occurrence :
6. Hours at which he started work on the day of accident :
7. a) Cause & nature of accident or dangerous occurrence :
b) If caused by machinery :
i) Name of the machine and part causing the accident, & :
ii) Whether it was moved by mechanical power at that time : Yes/No
c) Exactly what injured person was doing at that time :
8. Names & addresses of the witnesses to the accident : 1)
: 2)
9. Nature & extent of Injury :
10. Period of disability :

(2)

- 11. If accident is not fatal, state whether injured person is likely to be disabled for 48 hours or more : Yes/No
- 12. Name of Medical Officer in attendance on injured person :

I certify that to the best of my knowledge and belief that the above particulars are correct in every respect.

Date: **Manager** **Signature :**

Place: **Name :**

Competent Authority.

FORM FOR REPORTING ELECTRICAL ACCIDENTS

(See rule 44-A of the Indian Electricity Rules,1956;

&

Atomic Energy (Factories)Rules, 1996; rule 89(2))

1. Date and time of accident :
2. Place of accident and district :
3. System & Voltage of supply :
4. Name of the licensee or person/persons or
supplier or user of energy in whose premises
or jurisdiction the accident occurred :
5. a) (i) Name of the person :
- (ii) Animal(please specify the name and
 address of the owner) :
- b) Address of such/each person :
6. Occupation and designation of such
person/persons (and in particular whether
employed in electrical works or elsewhere) :
7. Brief description of the job undertaken, if any :
8. Authority under which such person / persons
was / were allowed to work on the job. State
also whether he/they was/were authorised
person/persons :
9. Describe fully nature and extent of injuries,
e.g. fatal, disablement of any portion of body
or other injury, etc. :
10. Detailed causes leading to the accident :
11. Action taken regarding first aid, medical
attendance, etc. immediately after the
occurrence of the accident. :
12. Whether appropriate Govt. Dist. and police
station informed (if so, give the address). :

(2)

13. Steps taken to preserve the evidence in connection with the accident to the extent possible. :
14. Name and designation/s of the person/s assisting the person/s killed or injured. :
15. What safety equipment were given to and used by the person/s who met with this accident(e.g. rubber gloves, rubber mats, safety belts and ladders, etc.). :
16. Whether isolating switches and other sectionalising devices were employed to deaden the sections for working on the same, if so, whether these were earthed. :
17. Whether the work on live lines was undertaken by an authorized person/s. If so, the name and designation of such person/s may be given. :
18. Whether artificial resuscitation treatment was given to the person who met with electric accident. If yes, for how long was it continued, before abandonment. :
19. Steps proposed to be taken to avoid recurrence. :
20. Names and designations of persons present at the time of accident. :
21. Any other remarks. :

Date:

Manager

Signature :

Time:

Name:

1. **Electrical Inspector of the region.**
2. **Competent Authority.**

Form - 14**Notice of Poisoning or Disease****(See rules 89(5), 90)**

1. Name of the Factory :
2. Name and address of the undertaking in which the patient presumes that he was exposed to the risk to which the poisoning or disease is attributed. :
3. Harmful agent or process :
4. Patient. Name :
Address :
5. 1. Sex : M/F 2. Age :
3. Designation: 4. Pay :
6. Precise occupation of the patient :
.1 at the place or last place of employment :
.2 at the undertaking in which the patient presumes that he was exposed to the risk. :
7. Nature of poisoning or disease. :
8. Approximate dates of beginning & cessation of exposure of the patient to the harmful agent or process mentioned in 3 above. :
9. General particulars :

Manager,**Signature:****Date:****Name:****Competent Authority.**

MODEL RULES FOR LABOUR WELFARE

MODEL RULES FOR LABOUR WELFARE

1. Definitions:

- (a) "Work Place" means a place at which, on an average, twenty or more workers are employed.
- (b) "Large work place" means a place at which, on an average 500 or more workers are employed.

2. First Aid :

At every workplace, there shall be maintained in a readily accessible place first aid appliances including an adequate supply of sterilized dressings and sterilized cotton wool as prescribed in the Factory Rules of the State in which the work is carried on. The appliances shall be kept in good order and in large work-places, they shall be placed under the charge of a responsible person who shall be readily available during working hours.

At large workplaces, where hospital facilities are not available within easy distance of the works First Aid Posts shall be established and be run by trained compounders.

Where large workplaces are remotely situated and far away from regular hospitals, an indoor ward shall be provided with one bed for every 260 employees.

Where large workplaces are situated in cities, towns or in their suburbs and no beds are considered necessary owing to proximity of city or town hospitals, suitable transport shall be provided to facilitate removal of urgent cases to these hospitals. At other workplaces, some conveyance facilities shall be kept readily available to take injured person or person suddenly taken seriously ill, to the nearest hospital.

At large workplaces these shall be provided and maintained an ambulance room of the prescribed sizes, containing the prescribed equipment and in the charge of such medical and nursing staff as may be prescribed. For the purpose the relevant provisions of the Factory Rules of the State Government of the area where the work is carried on may be taken as the prescribed standard.



3. **Accommodation for Labour :**

The Contractor shall during the progress of the works provide, erect and maintain necessary temporary living accommodation and ancillary facilities for labour at his own expense and to standards and scales as approved by the Engineer-in-Charge.

4. **Drinking water :**

In every workplace, there shall be provided and maintained at suitable places easily accessible to labour, a sufficient supply of cold water fit for drinking.

Where drinking water is obtained from an intermittent public water supply each workplace shall be provided with storage where drinking water shall be stored.

Every water supply storage shall be at a distance of not less than 15 meters from any latrine drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and water-proof.

A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. **Washing and Bathing Places :**

Adequate washing and bathing places shall be provided separately for man women. Such places shall be kept in clean and drained condition.

6. **Scale of Accommodation in Latrines and Urinals :**

There shall be provided within the precincts of every workplace latrines and urinals in an accessible place, and the accommodation, separately for each of these, shall not be less than at the following scales:-

	No. of Seats
(a) Where number of persons does not exceed 50	2
(b) Where number of persons exceeds 50 but does not exceed 100	3



(c) For additional persons per 100 or part thereof

3

In particular cases, the Engineer-in-Charge shall have the power to increase the requirement, where necessary.

7. Latrines and Urinals :

Except in workplaces provided with water flushed latrines connected with a water-borne sewage system. All latrines shall be provided with receptacles or dry-earth system which shall be cleaned at least four times daily and at least twice during working hours and kept in a strictly sanitary condition. Receptacles shall be tarred inside and outside at least once a year. If women are employed, separate latrine and urinals screened from those for men and marked in the vernacular in conspicuous letters "For Women Only" shall be provided on the scale laid down in rule 6. Those for men shall be similarly marked "For Men Only". A poster showing the figure of a man and of a woman shall also be exhibited at the entrance to latrines for each sex. There shall be adequate supply of water close to latrines and urinals.

8. Construction of Latrines:

Inside walls shall be constructed of masonry or some suitable heat resisting nonabsorbent materials and shall be cement washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for the purpose and kept available for inspection. Latrines shall have at least thatched roof.

9. Disposal of Excreta :

Unless otherwise arranged for by the local-sanitary authority, arrangements for proper disposal of excreta by incineration at the workplace shall be made by means of a suitable incinerator approved by the local medical health and municipal or cantonment authorities. Alternatively excreta may be disposed off by putting a layer of night soils at the Bottom of pucca tank prepared for the purpose and covering it with a 15 cm layer of waste or refuse and then covering it with a layer of earth for a fortnight(when it will turn into manure).

The Contractor shall, at his own expense, carry out all instructions issued to him by the Engineer-in-charge to effect proper disposal of soil and other conservancy work in respect of Contractor's work people or employees on the Site. The Contractor shall be responsible for payment of any charges



which may be levied by municipal or cantonment authority for execution of such work on his behalf.

10. Provision of shelters during rest :

At every work place there shall be provided free of cost, four suitable sheds, two for meals and two others for rest, separately for use of men and women Labour. Height of each shelter shall not be less than 3 meters from floor level to lowest part of roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 0.5 sq.m. per head.

11. Crèches :

At a place at which 20 or more women workers are ordinarily employed, there shall be provided at least one hut for use of children under the age of 6 years belonging to such women, Huts shall not be constructed to a standard lower than that of thatched roof, mud floor and wall with wooden plants spread over mud floor and covered with matting.

Huts shall provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean. There shall be two dais in attendance. Sanitary utensils shall be provided to the satisfaction of local medical health and municipal or cantonment authorities. Use of huts shall be restricted to children their attendance and mothers of children.

Where the number of women workers is more than 25 but less than 50, the Contractor shall provide at least one hut and one dai to look after children of women workers.

Size of creche (s) shall vary according to the number of women workers employed.

Creche (s) shall be properly maintained and necessary equipment like toys etc., provided.

12. Canteen :

A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary.



13. **Planning :**

Setting and erection of the above mentioned structures shall be approved by the Engineer-in-Charge, and the whole of such temporary accommodation shall at all times during the progress of the works be kept tidy and in a clean and sanitary condition to the satisfaction of the Engineer-in-Charge and at the Contractor's expenses. The Contractor shall conform generally to sanitary requirements of local medical, health and municipal or cantonment authorities and at all times adopt such precautions as may be necessary to prevent soil pollution of the Site.

On completion of the Works the whole of such temporary structures shall be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the whole of site left clean and tidy to the entire satisfaction of the Engineer-in-Charge and at the Contractor's expenses.

14. **Anti-malarial precautions :**

The Contractor shall, at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge, including filling up any borrow pits which may have been dug by him.

15. **Enforcement :**

The Inspecting Officer mentioned in the Contractors Labour Regulations or any other officer nominated in his behalf by the Engineer-in-Charge shall report to the Engineer-in-Charge all cases of failure on the part of the Contractor and or his subcontractors to comply with the provisions of these Rules either wholly or in part and the Engineer-in-Charge shall impose such fines and other penalties as are prescribed in the conditions.

16. **Interpretations etc. :**

On any question as to the application, interpretation or effect of these Rules, the decision of the Chief Labour Commissioner or Deputy Chief Labour Commissioner(Central) shall be final and binding.

17. **Amendments :**

Government may, from time to time add to or amend these Rules and issue such directions as it may consider necessary for the proper implementation of these Rules or for the purpose of removing any difficulty which may arise in the administration thereof.



GUIDELINES NO. AERB/NRF/SG/IS-1 (Rev. 1)



GOVERNMENT OF INDIA

AERB SAFETY GUIDELINES

CONTROL OF WORKS



ATOMIC ENERGY REGULATORY BOARD

AERB SAFETY GUIDELINES NO. AERB/NRF/SG/IS-1 (Rev. 1)

CONTROL OF WORKS

**Atomic Energy Regulatory Board
Mumbai-400 094
India**

December 2011

Price

Order for this guidelines should be addressed to:

The Administrative Officer
Atomic Energy Regulatory Board
Niyamak Bhavan
Anushaktinagar
Mumbai-400 094
India

FOREWORD

Activities concerning establishment and utilisation of nuclear facilities and use of radioactive sources are to be carried out in India in accordance with the provisions of the Atomic Energy Act, 1962. In pursuance of the objective of ensuring safety of members of the public and occupational workers as well as protection of environment, the Atomic Energy Regulatory Board (AERB) has been entrusted with the responsibility of laying down safety standards and enforcing rules and regulations for such activities. The Board, therefore, has undertaken a programme of developing safety standards, safety codes and related guides and manuals for the purpose. While some of the documents cover aspects such as siting, design, construction, operation, quality assurance and decommissioning of nuclear and radiation facilities, other documents cover regulatory aspects of these facilities.

Safety codes and safety standards are formulated on the basis of nationally and internationally accepted safety criteria for design, construction and operation of specific equipment, structures, systems and components of nuclear and radiation facilities. Safety codes establish the objectives and set requirements that shall be fulfilled to provide adequate assurance for safety. Safety guides and guidelines elaborate various requirements and furnish approaches for their implementation. Safety manuals deal with specific topics and contain detailed scientific and technical information on the subject. These documents are prepared by experts in the relevant fields and are extensively reviewed by advisory committees of the Board before they are published. The documents are revised when necessary, in the light of experience and feedback from users as well as new developments in the field.

Construction work is a labor-intensive industrial activity with large number of unskilled and migratory workforce under various contracts ranging from a mega package contract to a small work contract. Accidents during construction work are of major concern because of the high severity of injuries. The analysis of the accidents at construction sites indicates that 'fall from height' type of accidents are significantly higher than the other types of accidents. AERB safety guide titled 'Works Contract' (AERB/SG/IS-1) was issued in 1991 to emphasise safety requirements and ensure their implementation in execution of contracts. In view of the continual development of construction technologies and the need for enhancement of industrial safety in DAE units, inputs from AERB discussion meets on the subject, safety and occupational health professionals of DAE, AERB Fatal accident Assessment Committee, and directives on industrial safety issued by Chairman, AERB, the need for revision of the safety guide was felt.

This revised 'safety guidelines' is effective from the date of issue and supersedes the earlier guide on the subject. Part-A of the revised safety guidelines highlights safety requirements by 'Facilities' and Part-B highlights the requirements on safe execution of jobs by 'Contractors'. The facility management shall be strictly liable as a principal

employer for ensuring the compliance with the safety requirements by the contractors as laid down in Part-B. It should be noted that Part-A and Part-B should be read in conjunction, as the requirements are complementary to each other. However the 'Facility' may issue the Part-B along with the tender documents. The requirements spelt out in this 'safety guidelines' are in addition to the statutory requirements such as Factories Act 1948, Atomic Energy (Factories) Rules, 1996 and other applicable statutory requirements.

Consistent with the accepted practice, 'shall' and 'should' are generally used to distinguish between a firm requirement and a desirable option respectively. Appendices are an integral part of the document, whereas bibliography are included to provide further information on the subject that might be helpful to the user.

Specialists in the field drawn from the Atomic Energy Regulatory Board, the Bhabha Atomic Research Centre and the Nuclear Power Corporation of India Limited and other consultants have prepared this 'safety guidelines' document. It has been reviewed by the Advisory Committee on Industrial and Fire Safety (ACIFS).

AERB wishes to thank all individuals and organisations who have prepared and reviewed the document and helped in its finalisation. The list of persons, who have participated in this task, along with their affiliations, is included for information.



(S. S. Bajaj)
Chairman, AERB

SPECIAL DEFINITIONS

(Specific for the Present ‘Guidelines’)

Approval

A type of written consent issued by the designated authority.

Construction Agency/Contractor

An individual or organisation rendering services of design/construction/fabrication/installation/repair/inspection/review/maintenance/supplying items by the deployment of workers at site.

Dangerous Manufacturing Processes or Operations

The manufacturing processes or operations as specified under Rule 88 of the Atomic Energy (Factories) Rules, 1996.

Engineer-in-charge

A person designated by the Facility to act as an overall in-charge of work.

Facility

Any Unit of the Department of Atomic Energy awarding the contract.

Head, Industrial Safety

The chief safety officer or the overall in charge of Industrial Safety Section of the facility.

Line Managers

The person who has the field level managerial and supervisory control on the concerned work.

Safety Related Deficiency

The unsafe acts/unsafe practices/unsafe conditions in the work area, which have potential to cause injury/accident resulting into undesirable consequences to human beings or damage to the equipment/property/environment.

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PART-A
CONTROL OF WORKS
(FACILITIES)

1. INTRODUCTION

1.1 General

Department of Atomic Energy (DAE) through its constituent units execute various site works either by their own manpower or by manpower of various outside agencies. The nature of contracts with outside agencies can be works contracts, engineering procurement contracts, minor fabrication contracts etc. These site works involve entire gamut of conventional industrial activities like excavation, rock blasting, earth handling, construction, material handling, fabrication, installation, operation, maintenance etc. of nuclear or conventional plants/facilities. This is a challenging responsibility for the facility due to the complexity of problems like quality of workforce (which may be unskilled, illiterate, migratory) available for labor-intensive jobs, lack of coordination among agencies at site, lack of safety awareness among concerned authorities, time schedules of project etc. As primary employer of the workforce (facility or contractor) at site, it is the responsibility of the facility management to ensure health and safety of personnel engaged for the work. Any accidental injury or loss of life is detrimental to the facility as well as the society. This 'guidelines' covers the safety organisation and the safety management system requirements in sections two and three. The work specific safety precautions are covered in section four. The requirements relating to personal protective equipment and medical management are covered in sections five and six.

1.2 Objective

This 'guidelines' has a basic framework of industrial safety organisation, safety management systems, safe work procedures to maintain a safe working environment for all personnel and to prevent any unsafe condition/act endangering the life of personnel engaged for industrial activities. The major objectives of this 'guidelines' are:

- (i) To create awareness among workers about industrial hazards and safe working procedures.
- (ii) To lay down safe work procedures and systems to be followed for different type of industrial activities
- (iii) To establish a robust safety management system.
- (iv) To protect the health and ensure the safety of the workers from industrial activities.

1.3 Scope

This 'guidelines' is essential for implementation and assurance of conventional safety in areas such as industrial, chemical, electrical, fire, environmental and is applicable for all works taken up by the facility as well as contracted works like engineering procurement contract, minor fabrication contract etc. Where the execution of work is envisaged in radiation controlled area or involves handling and fabrication of any nuclear material, additional precautions noted in relevant AERB safety documents on radiation protection shall also be applicable.

2. SAFETY ORGANISATION

2.1 General

- (a) Construction projects have significant health and safety hazards, which need to be managed systematically since the project inception stage to achieve adverse incident free completion. A well-defined safety organisation helps in effective implementation of safety management systems and ensures health and safety of workers.
- (b) The safety organisation should assure the management that all the provisions of relevant Acts and Rules are conformed to.
- (c) Safety organisation should comply with all the requirements such as safety surveillance, safety training, safety enforcement measures, safety audit etc. related to all works to fulfill the overall safety requirements of this 'guidelines'.
- (d) Safety functionaries should be exclusively assigned with the work related to protection of health and safety of workers.
- (e) Safety organisation should directly report to the Project Director / Project Manager.
- (f) IS: 18001: 2007 gives detailed requirements of health and safety management system requirements. IS: 15793 gives requirements of good practices for managing environment, occupational health and safety legal compliance. This 'guidelines' prescribes requirements in addition to IS: 18001: 2007 and IS: 15793 and gives guidelines on implementing these specific to a construction project.
- (g) The requirements prescribed in various central and state regulations including *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996* and rules framed thereunder with respect to managing health and safety in construction projects, shall be complied with.

2.2 Organisational Structure for Safety Management

- (a) Organisational structure depends on the construction project. As an example, a typical organisational chart for safety management in a construction project would be as given in Fig 1.

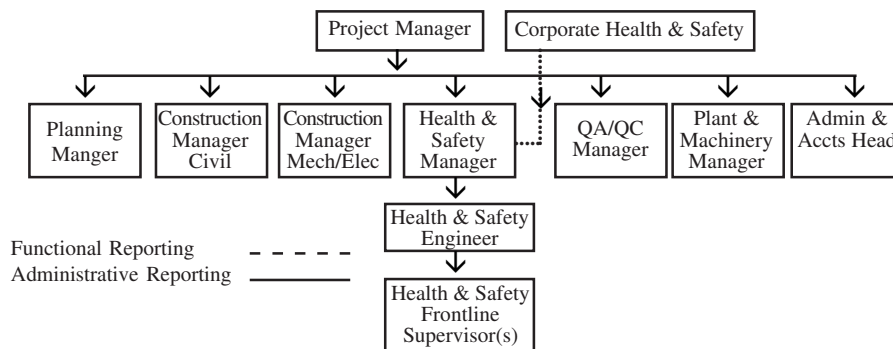


Fig -1 : Typical Organisation Chart

- (b) The organisational structure for Health and Safety will vary from project to project. On large and medium projects, it may be necessary to have a separate safety team for each sub-contractor who in turn shall report to safety team of the main construction agency.
- (c) The qualification, experience and the minimum number of safety professionals to be deployed should be as per the following table:

TABLE-1 : QUALIFICATION, EXPERIENCE & NUMBER OF SAFETY PROFESSIONALS FOR CONSTRUCTION PROJECTS

Category of safety person	Mandatory requirement	Qualification
Head, industrial safety	One at each site/unit	Degree in engineering/technology and diploma in industrial safety with minimum three years of experience
Safety officer	One in each shift (minimum) up to 1000 workers. If number of workers in a shift (including contractor's workers) exceeds 1000, additionally one safety officer should be deployed for every 1000 workers or part thereof.	Degree in engineering/technology and diploma in industrial safety with minimum two years of experience or Diploma in engineering with diploma in industrial safety with minimum 6 years experience or A recognised degree in physics or chemistry and has practical experience of working in a factory in a supervisory capacity for a period of not less than 5 years.

Category of safety person	Mandatory requirement	Qualification
		Notwithstanding the provision contained in the above criteria any person who (i) possesses a recognised degree or diploma in engineering or technology and has had experience of not less than five years in a department of the central or state government which deals with the administration of the Factories Act, 1948 or the Dock Workers (safety, health and welfare) Act, 1986 (54 of 1986) or (ii) Possesses a recognised degree or diploma in engineering or technology and has had experience of not less than 5 years, fulltime on training, education, consultancy, or research in the field of accident prevention in industry or in any institution, shall also be eligible for appointment as a safety officer: Provided that competent authority may, subject to such condition as it may specify, grant exemption from the requirement of this sub rule if in its opinion, a suitable person possessing the necessary qualification and experience is not available for appointment.
Safety supervisor	One in each shift (minimum) up to 500 workers. If number of persons working in a shift (including the contractors' workers) exceeds 500, additionally one safety supervisor should be deployed for every 500 workers or part thereof.	Diploma in engineering and diploma in industrial safety

3. SAFETY MANAGEMENT

3.1 General

- (a) Pre-construction stage activities of the project shall be required to be reviewed before the project management processes are initiated for the construction stage. While the project documents and proposals are reviewed for the adequacy of health and safety measures, it is essential to ascertain timeframes and budgets relating to health and safety measures, including extent of management systems proposed to be employed during construction.
- (b) A concise safety management system of the facility shall be established from the pre-construction stage itself. The tender documents of the project shall clearly communicate the health and safety requirements of the project to the prospective contractors. These may include:
 - (i) Project specific objectives and targets
 - (ii) Project specific health and safety requirements (technical as well as management systems)
 - (iii) Requirement of posting safety officers
 - (iv) Coordination among owner/client, project manager, consultants and facility
 - (v) Welfare facilities at the project for workmen
 - (vi) Reward system for good health and safety performance
 - (vii) Penalty system for non-compliances, violation and adverse incidents
 - (viii) Health and safety monitoring measures
 - (ix) Health and safety reports to be submitted and frequency.
- (c) The construction agencies (contractors) should be asked to submit a project specific health and safety plan (construction safety management plan) proposing the methodology for managing health and safety and their capability in completing the project in a safe manner.
- (d) The proposed construction safety management plans of the construction agencies and their past health and safety performance shall be considered as one of the criteria during pre-qualification and selection of construction agencies.

3.2 Safety Policy

- (a) The facility and the construction agency jointly or separately shall have a written statement prescribing the health and safety policy of the organisation. The health and safety policy conveys the management commitment and intent of the organisation towards health and safety, its organisation and arrangements to ensure that the set objectives are met. It also provides a framework for establishing, maintaining and periodically reviewing health and safety objectives and targets.
- (b) Health and safety policy shall meet the requirements of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996* and IS 18001.
- (c) The policy shall be communicated to all stakeholders through display and other means. The policy shall be displayed in local language(s) which may be understood by majority of the workmen.

3.3 Safety Plan

- (a) A project specific health and safety plan shall be developed by the facility. On approval by the project director, the project health and safety plan shall be reference document for implementation, control and monitoring of health and safety aspects of the project by the facility.
- (b) Project health and safety plan shall describe how the project specific health and safety objectives and targets shall be achieved. It shall define the road map for achieving the standards that an organisation lays down for itself so that efforts can be coordinated, synergised and monitored.
- (c) Health and safety plan shall explain the means of establishing a positive health and safety culture at the project site. Health and safety plan shall identify and enumerate the control measures to mitigate the risks to the project completion arising out of health and safety issues so that the project is allowed to proceed without interruption and executed as per schedule.

Salient aspects that may be covered in the project health and safety plan are:

- (i) Project specific health and safety objectives, targets and programmes in line with health and safety policy
- (ii) Hazard identification and risk assessment
- (iii) Meeting legal and other requirements

- (iv) Health and safety organisation
 - (v) Resources, roles, responsibility and authority
 - (vi) General health and safety rules
 - (vii) Health and safety requirements to be followed by sub-contractors
 - (viii) Operation control procedure
 - (ix) Activities requiring work permit system and its procedure
 - (x) Safe handling of chemicals, explosives, gas cylinders, electrical equipment etc.
 - (xi) Access control of employees
 - (xii) Safety of visitors
 - (xiii) Management of critical activities such as work at height, material handling and working with plant and machinery
 - (xiv) Ensuring the competency and awareness of the workmen
 - (xv) Fire prevention and fire fighting plan
 - (xvi) Emergency preparedness and response plan
 - (xvii) Traffic management plan
 - (xviii) Training matrix
 - (xix) Personal protective equipment matrix
 - (xx) Health and safety performance monitoring measures such as inspection and audit
 - (xxi) Incident reporting and investigation procedure
 - (xxii) Proactive and reactive indicators of health and safety
 - (xxiii) Reward and reprimand for health and safety performance
 - (xxiv) Checklist and formats
 - (xxv) Health monitoring plan for employees/workers exposed to hazardous job.
- (d) The risk control measures identified shall meet the provisions of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996*, other legislations and provisions of various safety related standards.
- (e) Procedures shall be established for timely recording and reporting of information required for continual improvement of health and safety performance. Internal reporting procedures shall cover:

- (i) Incident reporting
- (ii) Non-conformance reporting
- (iii) Health and safety performance reporting
- (iv) Hazard identification reporting

External reporting shall cover

- (i) Statutory reporting requirements

The recording of reporting of health and safety performance shall be clearly documented in the project health and safety plan.

3.4 Roles, Responsibility and Authority

- (a) Project manager shall define, document and communicate the roles, responsibilities and authorities of all personnel who manage, perform and verify activities having an effect on health and safety risks. It shall also include contractors and visitors.
- (b) Ultimate responsibility for health and safety shall rest with top management of the respective organisation.
- (c) The line management personnel who are responsible for execution of activities are directly responsible for health and safety in the work under their control.
- (d) Health and safety group and health and safety officers are responsible for guiding the top management on health and safety issues and facilitating the implementation of health and safety in the project site. For duties and responsibilities of health and safety officers refer Atomic Energy (Factories) Rules-1996.
- (e) Health and safety officers shall administratively report to the project manager and functionally report to the senior health and safety representative of the organisation.
- (f) Health and safety officers and health and safety group shall be empowered by the project manager for stopping any unsafe practices which are of imminent danger to employees. Health and safety group shall directly report to no less than the head of the project.
- (g) Health and safety supervisors shall be engaged to assist the health and safety officers in performing their duties.
- (h) Management shall provide adequate resources essential to effectively manage the health and safety requirements of the project. The resources shall include human resources, organisational infrastructure, technology and financial resources.

3.5 Design and Engineering

- (a) Design drawings, construction methodology and plans shall be reviewed to determine whether any additional risks may arise during the construction due to the features in the design or methodology.

Attention shall be paid to:

- (i) Providing permanent hooks and loops for tying safety slings of workers
 - (ii) Providing holes or such arrangements to the structure to which safe working platforms and safety nets can be connected
 - (iii) Significant risks from construction materials, which cannot be avoided in the design
 - (iv) Laying permanent slings, grab rails/bars to be used by the workers
 - (v) Permanent provision for attaching railings
 - (vi) Provision for alternative access to the trapped or distressed workers
 - (vii) Provision for communication
 - (viii) Design facilitating barricading of the area around work site without causing hindrance to building functional activities
 - (ix) Durability of such safety related permanent design integrated elements
 - (x) Other safety practices required for the type of works involved.
- (b) Analysis of design and integration of safety measures, as described above, should be undertaken as value engineering through multi-stakeholder consultation, necessarily involving designers, owner/client, operation/maintenance management and construction agency.
- (c) While need for special work methodology and enabling infrastructure is considered to make conditions safe for construction, attention shall also be drawn to the safety during maintenance operations (including inspections which may be necessary before project commissioning as well as maintenance).
- (d) It shall also be ascertained whether it would be feasible (within the time and cost considerations) to erect necessary temporary enabling infrastructure. If, in the due assessment by the project manager, it is established that the design, as proposed, would continue to be unsafe during construction and maintenance operations unless special

enabling infrastructure is created and work procedures specifically drawn, the design shall be reviewed.

3.6 Construction Planning

- (a) Prior to the start of construction work, detailed planning shall be carried out which may include:
 - (i) Identifying aspects of design that have bearing on health and safety during construction stage.
 - (ii) While scheduling the various activities of the construction, allowing adequate time to carry work in accordance with health and safety requirements.
 - (iii) Reviewing the proposed work method of various activities, identifying health and safety hazards of activities in the project and assessment of the risk level.
 - (iv) When the risk level is unacceptable, taking additional control measures including revision of the work methodology so that identified risk is at ALARP (as low as reasonably practicable) level.
 - (v) Planning and establishing the facilities for implementation of health and safety such as workmen training facility, health centre for medical check-up and first aid, access control of employees, etc.
 - (vi) Ensuring that the temporary establishments at project site such as site offices, workmen camps, toilets, canteens and rest sheds, etc. are created meeting the requirements of the relevant statutes and standards.
- (b) Facility shall ensure that the construction agency has understood the challenges and has planned to meet the project specific health and safety requirement through appropriate competencies.
- (c) Health and safety measures need proper coordination by the construction agency and such efforts of the construction agency shall be reviewed, monitored and appropriately guided by the facility.
- (d) In respect of sub-contractors, project manager of the construction agency shall ensure that the sub-contractors meet the health and safety requirements of the project. Health and safety control and monitoring shall be established specific to the needs of the project.
- (e) Past health and safety performance and capability of contractors to complete the job safely shall be given due consideration during selection of contractors. The project specific health and safety

requirements shall be clearly communicated to the contractors and a commitment obtained from them on meeting the requirements.

3.7 Safety Communication

- (a) Procedures shall be established to communicate significant hazards and risks to and from employees and other interested parties. The health and safety hazards and risks may be communicated in the following ways:
 - (i) Sharing of accidents case studies which occurred in the project site as well in other similar projects
 - (ii) Health and safety posters and displays
 - (iii) Health and safety campaigns and competition involving the employees
 - (iv) Sharing of results of the audits, inspections and other monitoring systems
 - (v) Establishing a system for collecting feedback on health and safety from employees and other interested parties
 - (vi) Tool box meeting
 - (vii) Safety signage.
- (b) Health and safety communications addressed to workmen shall preferably be in local language(s) understandable by majority of the workmen.
- (c) The owner/client, consultant and construction agency shall jointly endeavour to promote a positive health and safety culture at the project. Top management of the organisations should exhibit a visible management commitment and felt leadership towards health and safety. This shall be achieved by participating in health and safety programmes such as,
 - (i) Project health and safety committee meeting
 - (ii) Health and safety walk down
 - (iii) Including health and safety in all performance review meetings
 - (iv) Exhibiting a safe behaviour while at site.
- (d) The top management should clearly communicate that it considers safety as core value and it shall not allow it to get compromised. Such messages when it reaches down the level in the organisation enable to create a positive health and safety culture.

3.8 Safety Monitoring Programme

- (a) The objective of the safety surveillance programme should address assurance of effective implementation of safety measures in execution of works. Following surveillance programme should be in place at sites. The safety organisation should monitor, maintain record and follow up for corrective actions.
- (b) The surveillance programme should consist of identification of safety related deficiencies and status of corrections thereof, the implementation of protective measures, the safe work practices, human behavior etc.
- (c) Specific surveillance should be ensured with respect to testing of equipment, portable power tools, electrical equipment and tools, hand tools, surveillance of material handling equipment, transport equipment, earth moving equipment, gas cylinders etc. to comply with various statutory requirements.
- (d) Surveillance on safety awareness and training compliance including induction training, on the job training and refresher training, job specific pre-job briefing, job hazard analysis, etc. as per facility's guidelines should be ensured.
- (e) Safety related deficiencies should be detected by any employee of the facility and communicated by the safety officer to their line managers with a record and corrective measures monitored and recorded. The engineer-in-charge should specifically ensure this. These should be informed to Head, Industrial Safety within the stipulated time period as per the category of safety related deficiencies (SRDs).
- (f) Systematic record of safety related deficiencies (SRDs) attended and pending should be made by the facility and other executing agencies.
- (g) Head, Industrial Safety should verify periodically, at least once in 15 days that all safety related work permits issued are executed and recorded.
- (h) The health and safety performance monitoring and measurement procedures shall provide for:
 - (i) Both qualitative and quantitative measures appropriate to the project
 - (ii) Monitoring the extent to which project health and safety objectives are met

- (iii) Proactive measures of compliance that measures compliance with health and safety plan, operational control procedures and legislation
 - (iv) Reactive measures of performance to monitor accidents, ill health, near misses and non-conformances
 - (v) Monitoring dangerous occurrences
 - (vi) Fire occurrences
 - (vii) First aid injuries.
- (i) Health and safety audit is a systematic and independent examination to estimate if planned arrangements and activities are effectively fulfilling organisation's health and safety policy, plan and objectives. Its purpose is to find out:
 - (i) Whether the organisation has adequate procedures for identifying specific health and safety requirements
 - (ii) Whether such laid down procedures are followed and specific health and safety responsibilities are understood
 - (iii) Whether health and safety policies and risk assessment procedures identify the measures needed to avoid risks to employees and other interested parties
 - (iv) Whether the company has adequate procedures for devising, reviewing its health and safety standards
 - (v) Whether the company's health and safety standard identifies measurable targets
 - (vi) Whether the company has established adequate procedures for planning, implementing, controlling, monitoring and reviewing the health and safety measures.
- (j) Project health and safety management audits provide the method for monitoring and controlling health and safety activities and procedures throughout the life of the project. Audits can be internal or external. Internal audit can be conducted by the persons from the same organisation who are not directly connected with the work site to be audited. The external audits are performed through external professional experts.
- (k) Health and safety inspections shall be preferably conducted by a team of the concerned engineer, health and safety officer and area in-charge. Project manager and other senior personnel shall also join in some of the health and safety inspections.

- (l) The type of inspections that shall be carried out and the frequency shall be decided during the planning stage and documented in the project health and safety plan. The health and safety inspections should include:
 - (i) General site health and safety inspection
 - (ii) Electrical safety inspection
 - (iii) Plant and machinery inspection
 - (iv) Health and hygiene inspection
 - (v) Scaffolding safety inspection
 - (vi) Portable tools and tackles
 - (vii) Lifting tools and tackles
 - (viii) Fire equipment inspection
 - (ix) Illumination level and noise level monitoring
- (m) Project health and safety committee shall be constituted with project manager as the chairman, health and safety head as the secretary and representatives from various groups including workmen representatives as the members. The constitution and functioning of the committee shall meet the provisions of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996*.
- (n) This committee shall review the status of implementation of project health and safety plan, health and safety objectives and targets. Health and safety indicators and findings of the walk down by the committee members shall also be discussed and action plan derived.
- (o) Status of health and safety implementation shall be measured and monitored by several proactive indicators which include the following:
 - (i) Compliance level of project health and safety plan
 - (ii) Compliance level of health and safety observations with in the target date
 - (iii) Implementation status of training plan
 - (iv) Implementation status of corrective and preventive actions
 - (v) Compliance level of pre-employment medical checks and periodic medical checkups
 - (vi) Compliance level of legal and other requirements

- (vii) Percentage of activities for which detailed project specific risk assessment is conducted.
- (p) Procedures shall be established to report, investigate and analyze incidents. The procedures shall involve:
 - (i) Members of the incident investigation team
 - (ii) Agencies to be reported in case of incidents
 - (iii) Time period within which incidents need to be reported
 - (iv) Methodology for investigation and determining the root cause of accidents.

These procedures shall form a part of the project health and safety plan and monitored on a regular basis for its effectiveness.
- (q) All incidents including near miss cases, accidents and dangerous occurrences shall be thoroughly investigated, direct and root causes determined and corrective action planned. Incidents should be analysed covering the following ways to prepare and implement an effective prevention plan:
 - (i) Body part injured
 - (ii) Age of the victims
 - (iii) Time of accidents
 - (iv) Causes of accidents
 - (v) Nature of injury.

For detailed guidelines on analysis of incidents and computation of injury rate refer IS 3786.
- (r) The following reactive health and safety indicators should be used to measure and monitor the health and safety performance of the project site:
 - (i) Number of near miss cases
 - (ii) Number of first aid cases
 - (iii) Lost time injury frequency rate
 - (iv) Lost time injury severity rate.
- (s) The health and safety performance of contractors shall be monitored on a regular basis and necessary directive and support shall be given to achieve the set health and safety objectives and targets.

- (t) All accidents leading to property damage/fatal accidents/personnel injuries/near miss and dangerous occurrence should be reported to the engineer-in-charge immediately.
- (u) All 'near-miss' accidents should also be recorded/reported and investigated and recommendations arising out should be implemented on priority.
- (v) Facility/Contractor should also submit a monthly statement of accidents to engineer-in-charge/head, industrial safety by 4th of the following month showing details of accident, nature of injury including disability, days lost, treatment required, etc. and the extent of property damage.

3.9 Training/Orientation

- (a) It shall be ensured that all employees are competent to perform the assigned work safely on the basis of appropriate education, training or experience. The competency requirements of different categories of employees shall be mapped and procedures shall be implemented to ensure that those deployed meet the competence requirements.
- (b) Training needs of the different category of employees shall be identified at the beginning of the project and a training matrix and plan shall be prepared for implementation.
- (c) The objective of health and safety training shall be to equip the employee with necessary knowledge and skill to perform the work assigned to him in a safe manner, to foster continual improvement and to imbibe safety culture.
- (d) Preferably, the training should be carried out away from the working place of the participants to ensure focused attention on the training for both trainer as well as trainees.
- (e) After completion of training due procedure shall be followed for obtaining the feedback from the participants on the effectiveness of the training. Effectiveness of training imparted shall be monitored for continual improvement and necessary corrections in implementation.
- (f) The training/orientation programme should be implemented to meet the mandatory requirements. [Rule 43(2) (m) of the Atomic Energy (Factories) Rules 1996]. The training should be phased as follows:
- (g) Induction cum orientation training should include the overall safety aspects of the work and give a general overview of the various hazards, the particular activities and the do's and don'ts. As a part of training, workers should also be given demonstrations on use of

personal protective equipment, first aid, fire-fighting equipment, fire mock drills, other emergency preparedness etc.

- (h) The line manager along with the safety representative should conduct pre-job briefing on day-to-day basis prior to specific hazardous jobs. This will make the workers aware of the hazards and the precautions to be taken.
- (i) Refresher training should be imparted to each worker at least once in a year.
- (j) A training schedule should be prepared by the facility for implementation.
- (k) Records of training, demonstration and pep talk should be maintained.

3.10 Permit to Work System

- (a) Activities requiring permit to work shall be decided before starting the construction and shall be suitably documented in the project health and safety plan. Some of the activities which should require permit to work are:
 - (i) Excavation
 - (ii) Entry into confined spaces
 - (iii) Electrical work (HV/LV)
 - (iv) Opening manholes, covers and grills
 - (v) Blasting operation
 - (vi) Hot work
 - (vii) Work on plant and machinery & other power driven equipment
 - (viii) Working at height
 - (ix) Working at night
- (b) The facility should establish a permit to work system for any other hazardous activity, which it feels necessary to be controlled administratively for safe execution.
- (c) Record of safety work permit should be maintained in a systematic manner. All the safety conditions and requirements stipulated in the safety work permit should be ensured strictly.
- (d) Occupier should ensure that only authorized personnel are deployed for hazardous works/jobs (Refer item 3.11 for hazardous job) and provide facilities for the same.

3.11 Job Hazard Analysis

- (a) It should be ensured that a safe work procedure exists for all the hazardous jobs as mentioned hereunder and the requirements of the safety procedures are ensured at the work sites. Job hazard analysis (JHA) should form a part of such safe work procedures. A checklist based on JHA should be prepared. This checklist should be crosschecked by the line managers and verified by safety officer.

Typical list of jobs requiring job hazard analysis (this list is illustrative only and not exhaustive) is as follows:

- (i) Excavation
 - (a) Blasting including under water blasting
 - (b) Earth and stone removal/backfilling/dumping of earth/stones
 - (c) Any excavation more than 1.8 m depth.
- (ii) Work at height (working beyond 3.5 meters above ground)
 - (a) Erection and dismantling of scaffolding, platforms, shuttering/de-shuttering work
 - (b) Dome work, rod bending, construction of chimney and cooling towers
 - (c) Working on tower crane.
- (iii) Materials and material handling
 - (A) Critical equipment handling e.g.
 - (a) Calandria
 - (b) Steam generators
 - (c) Turbine generator components
 - (d) Diesel generator set
 - (e) Generator stator
 - (f) End shields
 - (g) Fuelling machines components
 - (h) Heat transport pumps etc.
 - (B) Hazardous chemical handling e.g.
 - (a) Acids and alkalis
 - (b) Chlorine

- (c) Hydrazine
 - (d) Morpholine
 - (e) Freon
 - (f) Ammonia
 - (g) LPG
- (C) Movement of heavy material by crane
- (D) Movement of tractor trolley on slopes
- (E) Manual lifting of heavy material to height
- (F) Erection of heavy machinery, equipment.
- (iv) Electrical connection
 - (a) Field connection for electrical installation
 - (b) Installation of lighting fixtures
 - (c) Charging of electrical system
 - (i) Charging of transformer, switch yard, switch gears
 - (ii) Working near high voltage lines
 - (iii) Use of portable electrical tools.
- (v) Equipment/structural erection work
 - (a) Material handling
 - (b) Loading and unloading
 - (c) Transportation of material from one place to other
 - (d) Steel fabrication and erection
 - (e) Cleaning and maintenance of batching plant equipment.
- (vi) Finishing/painting work
 - (a) Painting at height
 - (b) Painting in confined space.
- (vii) Other specific work
 - (a) Work with pneumatic tools/compressed air
 - (b) Work on pressure vessels/lines
 - (c) Work in the vicinity of steam lines
 - (d) Work in high enthalpy area

- (e) Work in high noise area
- (f) Work in confined space including tunnels & trenches
- (g) Work in isolated area (away from main site)
- (h) Radiography work
- (i) Work related to welding, gas cutting, grinding
- (j) Working near conveyor, rotating machine
- (k) Leak detection testing.

3.12 Reward and Reprimand

- (a) It is important to acknowledge and encourage good health and safety performance and suitably reprimand repeated violations, non-conformances and poor health and safety performances. Project specific reward and reprimand system shall be prepared as a part of the project health and safety plan.
- (b) To motivate the employees and organisation to work safely measures can be implemented based on the suitability. Selection and rewarding for the following categories may be considered on regular basis:
 - (i) Safest workmen
 - (ii) Safest supervisor
 - (iii) Safest area
 - (iv) Safest contractor, etc.
 - (v) Contractors and employees may be rewarded when the project achieves significant million man-hours without any lost time injury.
- (c) Unsatisfactory health and safety performance in the form of repeated violations, frequent adverse incidents and accidents shall be dealt with firmly. Depending on the seriousness of the violation the following options shall be considered:
 - (i) Issue of violation memorandum and obtaining written commitment for safe working
 - (ii) Suspension or termination of the employee from the present work
 - (iii) Suspension or termination of contract in case of construction agency
 - (iv) Imposition of penalty to the construction agency.

- (d) When penalties are imposed due records shall be maintained in a transparent manner. The main contractor shall be responsible wherever he deploys sub-contractor/petty contractor/piece rate contractor. The funds thus accrued may be spent in the form of rewarding employees for their sincere efforts towards improving the health and safety performance.

4. WORK SPECIFIC SAFETY SAFETY MEASURES

4.1 General

- (a) The occupier should ensure that safety precautions are taken during the execution of awarded work and work areas are maintained safe at all times. At the end of each shift and at all times when the work is suspended, it should be ensured that the work area is left safe in such a way that no materials and equipment that can cause damage to existing property, personal injury or interfere with the other works of the project or station are left in an unsafe manner.
- (b) The occupier should ensure to provide and maintain all lights, guards, fencing, warning signs, caution boards and other safety measures and provide for vigilance as and when necessary for the protection of workers and for the safety of others. The caution boards should also have appropriate symbols.
- (c) Adequate lighting facilities such as floodlights, hand lights and area lighting should be provided at the site of work, storage area of materials and equipment and temporary access roads within the working area.
- (d) All works should be planned so as to avoid interference with other facilities, works of other contractors or sub-contractors at the site. In case of any interference, necessary coordination should be ensured for safe and smooth working.
- (e) It should be ensured that the instructions given by the safety officer or his designated nominee regarding safety precautions, protective measures, housekeeping requirements, etc. are complied with. The safety officer with due intimation to engineer-in-charge should have the right to stop the work, if in his opinion, proceeding with the work will lead to an unsafe and dangerous condition. Engineer-in-charge should arrange to get the unsafe condition rectified and/ or provide appropriate protective equipment.
- (f) Engineer-in-charge should ensure that each job with a hazard whether small or big is intimated to the safety officer of the facility well before it is taken up.
- (g) The facility should be fully responsible for non-compliance of any of the safety measures or requirements, implications, injuries, fatalities, dangerous occurrences and compensation arising out of such situations or incidents.

- (h) Maximum duty hours of an individual should be as per the Factories Act 1948 or its latest amendment.
- (i) Illumination levels should be as per the statutory requirements.

4.2 Rock Blasting

- (a) All blasting operations should be carried out on the basis of procedures approved by Head, industrial safety and engineer-in-charge. All works in this connection should be carried out as per BIS specification/code (IS 4081: 1986. Title:- Safety code for blasting and related drilling operations (First Revision)). Barricades, warning signs etc. should be placed on the roads/open area.
- (b) Blasting permit should be obtained from Head, industrial safety at least one day before the blasting operation and precautions mentioned there in shall be ensured by the engineer-in-charge before blasting operation.
- (c) The blaster should have a licence from competent authority under Explosive Rules, 1983 for blasting work. It should also be ensured that he knows about the risks involved.
- (d) Blasting should be done under the supervision of competent engineer/supervisor.
- (e) Blasting in the open site should only be carried out during fixed hours every day/fixed day in the week between sunrise and sunset. Residents of adjacent area should be informed in advance about the blasting schedule.
- (f) No blasting should be undertaken during thunderstorm.
- (g) Necessary precaution should be taken to ensure the stability/integrity/safety of the adjacent structure by limiting the peak particle velocity.
- (h) No loose material, such as tools, drilling equipment, etc. should be left on the surface to be blasted. Proper muffling arrangement of the blasting area should be ensured to avoid flying of blasted material.
- (i) Authorised blaster should personally ensure that all the personnel/equipment has been removed from the blasting area before the blasting operations.
- (j) Blasting area should be free of detonating gas, inflammable objects, sparking or damaged wiring system, stray currents and static electricity.
- (k) All electrical lines in blasting area should be de-energised.
- (l) Entry of unauthorised personnel should be prevented by displaying warning signs.

- (m) In case of misfire, no person should be allowed to approach the blasting site unless it is inspected and cleared by a competent engineer/supervisor.
- (n) Explosives and blasting material should be stored only in clean, dry, well-ventilated, suitably constructed bullet/ magazine which should be fire resistant and securely locked. Stock book should be kept accurate and maintained. Licence should be obtained for storage of explosive as per the Explosives Act, 1884.
- (o) Blasting caps, electric blasting caps or primers and detonators should not be stored in the same box, container or room with other explosives.
- (p) Precautions against lightening should be provided in accordance with Indian Electricity Rules, 1956 (amended in 2000).
- (q) The explosives should be transported in specially designed vehicles bearing a special sign or inscription entitled 'DANGER - EXPLOSIVES'. Also detonators separated from other explosive should be transported in a separate compartment.

4.3 Excavation, Trenching and Earth Removal

- (a) Before taking up excavation work, necessary permission should be obtained from the engineer-in-charge with reference to existing underground services.
- (b) The engineer-in-charge of the works should exercise full care to ensure that no damage is caused by him or his workmen, during the operation/excavation etc., to the existing water supply, sewerages, power or telecommunication lines or any other services or works. He should provide and erect before construction, substantial barricades, guardrails, and warning signs around the work area. He should also furnish, place and maintain adequate warning lights, display board, signals etc., as required.
- (c) All trenches 1.2 m or more in depth should at all times be supplied with at least one ladder for every 30 m along the trench. Ladders shall extend from bottom of the trench to at least 1 m above the surface of the ground.
- (d) The sides of the trench/pit in soil, which are 1.2 m or more in depth should be stepped back to give suitable slope (angle of repose) or securely held by timber bracing or appropriate shoring/support, to avoid the danger of soil slides from collapsing. The excavated material should not be placed within 1.5 m or half of the depth of the pit whichever is more from edges of the trench/pit. Cutting should be done from top to bottom. Under no circumstances mining or under-cutting should be done.

- (e) Workers should not be exposed to the danger of being buried by excavated material or collapse of shoring. Measures to prevent dislodgment of loose or unstable earth, rock or other material from falling into the excavation by proper shoring shall be ensured.
- (f) The stability and safety of the excavation, adjacent structures, services and other works should be ensured.
- (g) All excavated area should be fenced off by suitable railing and installation of caution board to warn the persons from slipping or/ falling into the excavation pit/ mound.
- (h) All excavated areas shall have an illumination level of at least 20 lux for night work and a red danger light shall be displayed at prominent place near the excavation site to warn approaching traffic and men.
- (i) For removal of earth from an earth mound/excavated heap a written permission should be obtained from the engineer-in-charge of the work. As far as practical, earth should be removed mechanically. Wherever manual removal of earth is involved, earth should be removed from the top by maintaining a slope equal to the angle of re-pose of the earth. Such work should be constantly supervised to ensure that no under-cutting is done and to ensure that no person is trapped.
- (j) Dumping of excavated soil should be done at a specified area under proper supervision with respect to signaling, illumination and safety clearance.
- (k) It should be ensured that at a construction site of a building or other construction work, every vehicle or earth moving equipment is equipped with a) silencers, b) tail lights, c) power and hand brakes, d) reversing alarm e) search light for forward and backward movement, which are required for the safe operation of such vehicle or earth moving equipment and f) the cab of the vehicle or earth moving equipment is kept at least one meter from the adjacent face of a ground being excavated. g) indicator etc.
- (l) It should be ensured that when a crane or shovel is traveling, the boom of such crane or shovel is in the direction of such travel and the bucket or scoop attached to such crane or shovel is raised and without load, except when it is traveling downhill.
- (m) Before loading or unloading power trucks or trailers attached to tractors, the brakes should be applied and if vehicle is on a sloping ground, the wheels should be blocked. Handcart should not be used for the transfer of construction/erection materials in the construction

area. However if the exigency demands urgent transfer of light materials a small handcart may be permitted with the prior approval of the engineer-in-charge.

- (n) It should be ensured that at a construction site of a building or other construction work:
 - (i) All transport or earth moving equipment and vehicles are inspected at least once in a week by responsible persons and in case any defect is noticed in such equipment or vehicle, it is immediately taken out of service.
 - (ii) Safe gangways are provided for to and fro movement of building workers engaged in loading and unloading of lorries, trucks, trailers and wagons.
 - (iii) All earth moving equipment, vehicles or other transport equipment be operated only by such persons who are adequately trained and possess such skills as required for safe operation of vehicles or other transport equipment.
 - (iv) Trucks and other equipment are not loaded beyond their safe carrying capacity, which should be clearly marked on such trucks and other equipment.
 - (v) No unauthorised person rides the transport equipment employed in such work.
- (o) It should be ensured at a construction site of a building or other construction work that:
 - (i) A shovel or an excavator whether operated by steam or electric or by internal combustion used for such work is constructed, installed, operated, tested and examined as required under any law for the time being in force and the relevant national standards.
 - (ii) Buckets or grabs of power shovels are propped to restrict the movement of such bucket or grabs while being repaired or while the teeth of such bucket or grabs are being changed.
- (p) It should be ensured at a construction site of a building or other construction work that:
 - (i) An operator of a bulldozer before leaving – applies the brakes, lowers the blade and ripper and puts the shift lever into neutral.
 - (ii) A bulldozer is parked on level ground at the close of the work.
 - (iii) The blade of a bulldozer is kept low when such bulldozer is moving uphill.

- (iv) Bulldozer blades are not used as brakes except in an emergency.
- (q) It should be ensured at a construction site of a building or other construction work that:
 - (i) A tractor and a scraper are joined safely at the time of its operation
 - (ii) The scraper bowls are propped while blades of such scraper are being replaced.
 - (iii) A scraper moving downhill is driven in low gear.
- (r) It should be ensured at a construction site of a building or other construction work that:
 - (i) Before a road roller is used on the ground, such ground is examined for its bearing capacity and general safety, especially at the edges of slopes such as embankments on such grounds.
 - (ii) A roller is not moved down hill with the engine out of gear.
- (s) Vehicle carrying excavated material should have proper cover over the driver's cabin.

4.4 Safe Means of Access/Platforms

- (a) Adequate safe means of access and exit should be provided for all work places, at all elevations.
- (b) Suitable scaffolds should be provided for workmen for all works that cannot be done safely from the ground, or from solid platform except such short duration work that can be done safely from ladders. Bamboo/wooden scaffolding should not be permitted.
- (c) Where the platform for working is more than 3.5 m above ground, the width of the platform should be minimum 1 m.
- (d) Ladder should be of rigid construction having sufficient strength for the intended loads. Wooden/bamboo/rope ladders should not be permitted. All ladders should be maintained in good condition. The ladders should be fixed to the ground or rigid platforms. An additional person should be engaged for holding the ladder, if ladder is not securely fixed. Ladder shall be extended from floor to at least one meter above the platform.
- (e) A portable ladder should be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical). Ladders should not be used for climbing while carrying materials in hands. While climbing both the hands should be free.

- (f) Any working platform on scaffolding or staging more than 3.5 m above the ground or floor should have a guard rail attached, bolted, braced at least 1 m high above the floor or platform of such scaffolding or staging along with mid-rail.
- (g) The planks used for any working platform should not project beyond the end supports to a distance exceeding four times the thickness of the planks used. The planks should be rigidly fixed at both ends to prevent sliding, slipping or tilting. The thickness of the planks should be adequate to take load of men and materials and should not collapse. Plywood or packing wood should not be used as planks.
- (h) The guardrail should extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of materials. Standard railing should have posts not more than 2 m apart and an intermediate rail halfway between the floor or platform of the scaffolding and the top rail. Such scaffolding or staging should be so fastened as to prevent it from swaying from the building or structure. Scaffolding and ladder should conform to IS 3696 (Part 1): 1987 and (Part II): 1996.
- (i) Working platforms of scaffolds should have toe boards at least 15 cm in height to prevent materials from falling down.
- (j) A sketch of the scaffolding proposed to be used should be prepared and approval by the engineer-in-charge obtained prior to start of erection of scaffolding. All scaffolds should be examined by engineer-in-charge before use.
- (k) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or gangway or stairway is more than 3.5 m above ground level or floor level. They should have adequate width for easy movement of persons and materials and should be suitably guarded.
- (l) No single portable ladder should be used for access to a height of more than 4.5 m. For ladders up to 3m in length the width between styles (side bars)/width in the ladder should in no case be less than 300 mm. For longer ladders this width should be increased by at least 20 mm for each additional meter of length. Step/rungs spacing should be uniform and should not exceed 300 mm. Portable ladder should be used only for access to work place. In case work place is higher than 4.5 meters, pre-fabricated steel staircase should be used.

4.5 Work at Height

- (a) Person to work at height should be medically fit and should have height pass issued by safety section. (Appendix A Part A, B and C). Safety training should be imparted before working at height.

- (b) Safety work-permit system for working at height should be obtained from industrial safety section.
- (c) At elevated places, secure access and foothold should be provided. Adequate and safe means of access and exit should be provided at all work places for all elevations. Means of access may be portable or fixed ladder, ramp or a stairway. The use of crosses, braces or framework, as a means of access to the working platform should not be permitted.
- (d) Linear movement at height should be reduced to minimum. In case of such movement provision for anchoring the safety belt should be made.
- (e) Where barricades cannot be installed, a safety net of adequate strength should be installed close to the level at which there is a danger of fall of personnel/fall of objects.
- (f) In case where 'work at height' is on asbestos roof, crawling board, roof ladder should be used to walk across the asbestos roof.

4.6 Electrical Safety

- (a) All electrical installations shall comply with the appropriate statutory requirements given below and shall be subject to approval of the electrical engineer and safety officer.
 - (i) The Electricity Act, 2003
 - (ii) The Indian Electricity Rules 1956 (as amended in 2000)
 - (iii) The National Electricity Code 2008
 - (iv) Atomic Energy (Factories) Rules, 1996
 - (v) Other relevant rules of statutory bodies and power supply authority
 - (vi) Relevant standards of BIS

In addition to the above statutory provisions, the clauses indicated in this document shall also be complied.

- (b) It shall be the responsibility of the user seeking temporary power supply to indicate in writing, if any of the clauses (requirements noted in above regulations and in this document) are conflicting with each other and for which the user cannot decide the course of action regarding safe installation, commissioning, operation, maintenance and decommissioning of the electrical installations.

- (c) The electrical engineer and safety officer of the facility providing temporary power supply shall interpret the concerned conflicting clauses and approve in writing the safe course of action.
- (d) The Application Form-1 (Form-1A, 1B and 1C) as mentioned in Appendix-B should be submitted by the user for getting the temporary power supply.
- (e) After installation of temporary electrical panels, wiring works by the user, certificates as per Form-1D (Appendix-B) should be submitted to the provider.
- (f) Certificate of safety officer and authorisation of electrical engineer for energisation of temporary power supply should be filled as per Form-1E (Appendix-B).

4.7 Material Handling and Lifting Machines and Tackles

- (a) It should be made compulsory to supervise jobs like lifting/placing/loading/unloading/carrying/transporting etc. of heavy material by qualified supervisor having knowledge about hazards involved and precautions to be taken for such job.
- (b) The line managers should ensure that the material handling equipment used is adequate to handle the load.
- (c) Manual pulling of heavy equipment and trolley loaded with heavy material is not to be permitted.
- (d) Stacking and handling of heavy materials should be done on a firm ground to prevent settlement.
- (e) No lifting machine and no chain, rope or lifting tackle, except a fiber rope or fiber rope sling, shall be taken into use in any factory for the first time in that factory unless it has been tested and all parts have been thoroughly examined by a competent person. A certificate of such a test and examination specifying the safe working load or loads and signed by the person making the test and the examination has been obtained and is kept available for inspection.
- (f) Use of lifting machines and tackles should conform to relevant BIS requirements [IS 13367 (Part 1): 1992 Reaffirmed 2003, IS 4573: 1982 (Reaffirmed 2000) and IS 13834 (Part 1): 1994 Reaffirmed 2003 etc. The accessories and the attachments, anchorages and supports etc. should be ensured in healthy conditions by regular inspections at defined frequencies.
- (g) Every rope used in hoisting or lowering materials or as a means of suspension should be of good quality and adequate strength and free

from any defect. This should be ensured by regular inspection as per IS 2762: 1982- Specification for wire rope slings and sling legs (first revision).

- (h) Every crane operator or lifting appliance operator should be authorised. No person under the age of 18 years should be in charge of any hoisting machine or give signal to an operator of such machine.
- (i) In case of every lifting machine (and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or as a means of suspension) the safe working load should be ascertained and clearly marked. In case of a lifting machine having a variable safe working load, each safe working load and the conditions under which it is applicable should be clearly indicated. No part of any machine should be loaded beyond the safe working load except for the purpose of testing. This should be approved by the engineer-in-charge and head, industrial safety.
- (j) In case of facilities machines, the safe working load should be notified by the engineer-in-charge. As regards the contractor's machines, the contractor should declare the safe working load of the machine to the engineer-in-charge whenever he brings any machinery to site of work and get it verified by the engineer-in-charge, supported by a valid test certificate by the competent person.
- (k) Thorough inspection and load testing of lifting machines and tackles should be done in the presence of competent person at least once in every 12 months and records of such inspections and testing should be maintained.
- (l) No mobile crane should be allowed to move under live high-tension power transmission line.
- (m) While lifting loads, cranes should be located on level ground.
- (n) A thorough load analysis should be carried out before using cranes in tandem.
- (o) Motors, gear transmission, couplings, belts, chain drives and other moving parts of hoisting appliances should be provided with adequate safeguards. Hoisting appliances should be provided with such means, which will reduce the risk of any part of a suspended load becoming accidentally displaced or lowered.
- (p) It should be ensured that the cabin of the lifting machine in outdoor service:
 - (i) is made of fire resistant material,

- (ii) has a suitable seat, a footrest and protection from vibration,
- (iii) affords the operator an adequate view of the area of operation,
- (iv) affords the operator adequate protection against the weather, and
- (v) is provided with fire extinguisher.

4.8 Welding and Gas Cutting

- (a) Welding and gas cutting operations should be done by qualified and authorized persons only.
- (b) Safety work permit should be obtained (wherever necessary like presence of flammable or combustible material etc.) before flame cutting/welding is taken up.
- (c) Welding and gas cutting should not be carried out in places where flammable or combustible materials are kept and where there is danger of explosion due to presence of gaseous mixtures. In case the requirement cannot be avoided, specific approval and procedure should be ensured and adequate precautions should be taken.
- (d) Welding and gas cutting equipment including hoses and cables should be maintained in good condition.
- (e) Barriers should be erected to protect other persons from harmful rays from the work. When welding or gas cutting is done in elevated positions, precautions should be taken to prevent sparks or hot metal falling below on persons or combustible materials.
- (f) Suitable type of protective clothing consisting of fire resistant gauntlet gloves, leggings, boots and aprons should be provided to workers as protection from heat and hot metal splashes. Face shields with filter glasses of appropriate shade should be worn.
- (g) Adequate ventilation should be provided while welding, brazing and cutting the metals like zinc, brass, bronze, galvanised or lead coated material.
- (h) Welding and gas cutting on drums, barrels, tanks or other containers should be taken up only after ascertaining that they have been emptied, cleaned thoroughly and made free of flammable material.
- (i) Fire safety measures should be available as required near the location of welding/cutting operations.
- (j) Flash back arrestor should be provided with gas cutting and gas welding sets.

- (k) For electric (Arc) welding the following additional safety precautions should be taken:
 - (i) When electrical welding is undertaken the return lead of welding machine should be directly connected to the job invariably.
 - (ii) Provision must be in place in electric welding machine to prevent physical contact with live parts.
 - (iii) The welding cables and power cables should be routed separately to avoid entanglement.
 - (iv) The electric welding set should have suitable earth connections. There should be an electrical isolation device in the input power supply side on the welding machine.
- (l) Double gauges should be used for all gas cylinders used for cutting/welding. Pressure gauges/regulators should be in healthy condition.

4.9 Rotary Cutters/Grinders

- (a) All portable cutter/grinders should be provided with the wheel guard in position.
- (b) Grinding wheels of specified diameter only should be used on all grinders in order to limit the prescribed peripheral speed.
- (c) In pedestal grinder, the gap between tool rest and grinding wheel should be maintained less than 3 mm.
- (d) Goggle/face shield should be used during grinding operation.
- (e) No grinding wheel should be used after its expiry date.
- (f) Ear muff/ear plug should be used during the welding/cutting jobs.
- (g) Portable appliances, which are powered by single phase AC supply, shall be provided with three-core cable and three pin plug, otherwise the whole body should be double insulated.
- (h) Safety work permit should be obtained (wherever necessary like presence of flammable or combustible material etc.) before grinding is taken up.
- (i) Fire safety measures should be available as required near the location of grinding operations.

4.10 Concrete Mixing Equipment

- (a) Cement bags should be stacked on wooden planks in dry and leak proof area, 150 mm to 200 mm from the floor and 450 mm away

from walls. Height of the stack should not be more than 15 bags or 1.5 meters whichever is lower. Width of the stack should not be more than 4 bags or 3 meters. Lateral loading of the walls of the storage room by stacking should not be permitted. Stacking of the bags should not be used as a working platform.

- (b) Shuttering and supporting structures should be of adequate strength and approved by engineer-in-charge. This should be ensured before concrete is poured.
- (c) If the mixer has a charging skip the operator should ensure that the workmen are out of danger before the skip is lowered.
- (d) Adequate walking platforms (as per the AERB directives) are to be provided in the reinforcement area to ensure safe walking for pouring concrete on the roof.
- (e) When workmen are working/cleaning the inside of the drum of mixer, the power of the mixer should be switched off and "Do not operate" tag should be provided. The plant operation and cleaning of mixing pan should be carried out as per equipment supplier's instructions.
- (f) Interlocks between the cover and the mixer rotor shall be established to ensure that the agitator does not start when the cover is in open condition.
- (g) It should be ensured that moving parts of the elevators, hoists, screens, bunkers, chutes and grouting equipment used for concrete work and of other equipment used for storing and transporting of ingredients of concrete are securely fenced to avoid contact of workers with such moving parts.
- (h) It should be ensured that screw conveyors used for cement, lime and other dusty material are completely enclosed.
- (i) Workers engaged for handling bulk cement in a confined place should be provided with tight fitting goggles, approved respirators and protective clothing, which will fit snugly around the neck, wrist and ankles.
- (j) The following should be ensured for every pipe carrying pumped concrete:
 - (i) The scaffolding carrying a pipe for pumped concrete should be strong enough to support such pipe at a time when such pipe is filled with concrete or water or any other liquid and to bear safely all the building workers who may be on such scaffold at such time.

- (ii) Securely anchored at its end point and each curve on it.
 - (iii) Provided with an air release valve near the top of such pipe; and securely attached to a pump nozzle by a bolted collar or other adequate means.
- (k) The following should be ensured while using the electric vibrators in concreting work at a construction site of a building or other construction work such that:
 - (i) Such vibrators are earthed.
 - (ii) The leads of such vibrators are heavily insulated.
 - (iii) The current is switched off when such vibrators are not in use.
- (l) For obtaining a clearance for first pour of concrete and regular operation of ready mix concrete (RMC) plant, checklist given in Appendix-C shall be submitted to AERB along with the application for clearance.

4.11 Painting

- (a) Appropriate breathing air respirators should be provided for use by the workers when paint is applied in the form of spray, or a surface having lead paint is dry rubbed or scraped.
- (b) Only the quantity of paint, thinner and polish required for the day's work should be kept at the work spot. Excess storage should not be permitted at the work spot.
- (c) Smoking, open flames or sources of ignition should not be allowed in places where paints, varnish, thinner and other flammable substances are stored, mixed or used. A caution board, with the instructions written in national language and regional language, 'SMOKING - STRICTLY PROHIBITED' should be displayed in the vicinity where painting is in progress or where paints are stored. Symbols should also be used on caution boards.
- (d) All electrical equipment of paint storage room should be of explosion proof design. Suitable fire extinguishers/sand buckets should be kept available at places where flammable paints are stored, handled or used.
- (e) When painting work/hot resin mix is done in a closed room or in a confined space, adequate ventilation should be provided and ensured. In addition, suitable respirators should be provided. No portable electric light or any other electric appliance of voltage exceeding

24 volts should be permitted for use inside any confined space. Walkie-talkie or other means of communication should be provided. Rescue arrangement like full body harness with lifeline, tripod with pulley and extra BA sets should be available.

- (f) The workers should use PVC gloves and/or suitable barrier creams to prevent the skin contact with Epoxy resins and their formulations used for painting.

4.12 Demolition

- (a) Before any demolition work is commenced and also during the progress of the work, all roads and open area adjacent to the work site should either be closed or suitably cordoned. Appropriate warning signs should be displayed for cautioning approaching persons/vehicles.
- (b) Before demolition operations begin, it should be ensured that all the service lines are de-energized.
- (c) Persons handling demolition operations shall use appropriate PPE.
- (d) All demolition operations should be carried out with safe and duly approved procedures which shall include following but not limited to:
 - (i) No masonry/material should be permitted to fall in such masses or volume or weight so as to endanger the structural stability of any floor or structural support.
 - (ii) No wall, chimney or other structure or part of a structure is left unguarded in such a condition that it may fall, collapse or weaken due to wind pressure or vibration.
 - (iii) No floor, roof or other part of the building should be overloaded with debris or materials as to render it unsafe.
- (e) After the demolition, the debris and other materials collected should be disposed safely and not permitted to be dropped freely.
- (f) Entries to the demolition area shall be restricted to authorised persons wearing safety helmets and safety shoes.

4.13 Traffic

- (a) All the vehicles moving at sites should conform and comply with the requirements of Motor Vehicles Act, 1988 and the Rules made there under. All the drivers/operators of vehicles should possess valid driving license as per Motor Vehicles Act, 1988 or its latest amendment.

- (b) The facility should conduct operations so as to interfere as little as possible with the use of existing roads at or near locations where the work is being performed. When interference to traffic is inevitable such as road cutting or transit unloading of heavy equipment etc. notice of such interference should be given to the engineer-in-charge and safety officer well in advance with the details of start of the work and time required.
- (c) A cleaner/assistant must be available for all heavy vehicles whenever vehicles move forward as well as in the reverse direction. All vehicles should be fitted with proper reverse horns, back view mirrors and indicator signals.
- (d) Facility should ensure that the assessment of the driver's visual ability is carried out as per Rule 55 of the Atomic Energy (Factories) Rules, 1996/guidelines of advisory committee on occupational health (ACOH), AERB or as per the latest amendments in statutes.
- (e) Effective speed breakers with yellow stripes on the roads to regulate the speed at the vulnerable points should be installed. Effective barricading with adequate caution signs should be placed to warn the vehicle drivers whenever the jobs are carried out on the road.
- (f) All vehicles moving at the site should have roadworthiness certificate issued by the concerned authority.
- (g) Special limit boards and caution boards indicating turns should be installed wherever necessary.
- (h) In general, the following maximum speed limits should be specified and implemented. Vehicles speed limits should be as per Motor Vehicle Act or 20 Km/h. Extra precautions and care should be exercised particularly during heavy material/equipment movements.
- (i) Safety awareness programmes should be conducted for all the drivers of the light, medium and heavy vehicles.

4.14 Work in Radiation Area

The facility should follow the stipulated procedure under Atomic Energy Radiation Protection Rules, 2004 and AERB safety manual on 'Radiation Protection for Nuclear Facilities' (AERB/NF/SM/O-2) regarding work in the radiation area and other works related with radiography.

4.15 Work in and Around Water Bodies

- (a) When work is done at a place where there is risk of drowning, all necessary rescue equipment such as life buoys and life jackets should be provided and kept ready for use.

- (b) All necessary steps shall be taken for prompt rescue of any person in danger and adequate provision should be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work. Proper record of entry/exit to and from water bodies shall be maintained on shift basis and search operation shall be conducted as soon as any person is detected to be missing.
- (c) Caisson Work
 - (i) Safe means of access should be provided to the place of work in the caisson and adequate means should be provided to safely reach the top of caisson in the event of inrush of water
 - (ii) The work relating to construction, positioning, modification or dismantling of caisson shall be done under the supervision of a responsible person

4.16 Fire Safety

- (a) All provisions for fire safety shall be complied as per AERB safety standard on 'Fire Protection Systems for Nuclear Facilities' [AERB/NF/SS/FPS (Rev. 1)].
- (b) All necessary precautions should be taken to prevent outbreak of fires at the construction site. It should be ensured that all hot work is carried out under valid work permit.
- (c) Combustible materials such as wood, cotton waste, oil, coal, paints, chemicals etc., should be segregated and kept to the required bare minimum quantity at work place.
- (d) Containers of paints, thinners and allied materials should be stored in a separate room which should be well ventilated and free from excessive heat, sparks, flame or direct rays of the sun. The containers of paint should be kept covered or properly fitted with lid and should not be kept open except while using.
- (e) Adequate number of trained persons from approved fire training centre required to extend fire safety coverage should be ensured.
- (f) Fire extinguishers as approved by the engineer-in-charge/in-charge of fire station/safety-in-charge should be located at the construction site at appropriate places.
- (g) Adequate number of trained workmen in fire fighting who can operate fire extinguishers should be ensured.
- (h) Portable fire extinguishers with periodic inspection, maintenance and re-filling complying with the mandatory requirements should be ensured.

- (i) Availability of adequate water for fire fighting should be ensured.
- (j) Implementation of the provisions of various statutory licenses for storing gas cylinders, petroleum products, explosives etc. as per the relevant acts and rules should be ensured wherever required.

4.17 Environmental Safety

Relevant provisions of the state/central statutory authority regarding environment protection should be adhered to.

4.18 Public Protection

The Facility should make necessary provisions to protect the public. He should be bound to bear the expenses in defense of every action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of any precaution required to be taken to protect the public. He should pay for the any such damage and cost which may be awarded in any such suit, action or proceedings to any such person, or the amount, which may be fixed as a compromise by any such person.

4.19 Safety of Visitors

- (a) Visitors for the project shall be given health and safety induction before they are allowed in to the construction project. It shall include the minimum PPE to be used, hazards and risks at the work area, restricted areas of entry, emergency response arrangements, etc.
- (b) Visitors shall always be accompanied by one of the employees of the project site.
- (c) Visitors shall not be allowed in the hazardous areas unless they are competent and trained to work in such areas.

4.20 Housekeeping

- (a) It should be recognised that a proper place for everything and everything in its place is maintained for a good housekeeping.
- (b) The material required for immediate use only should be brought to the designated workplace and stacked properly and labeled suitably.
- (c) All work spots, site office and surroundings should all times be kept clean and free from debris, scrap, concrete muck, surplus materials and unwanted tools and equipment. A day-to-day collection and disposal of scraps/debris should be done safely at designated place.
- (d) Electrical cables, leads and hoses should be so routed as to allow safe traffic by all concerned. Cable should be preferably supported on the brackets fixed along the wall to maintain safe access. Wherever

routing on the floor cannot be avoided, care should be taken to ensure mechanical protection of these cables and safe access is not disturbed.

- (e) No material on any work place should be so stacked or placed or disposed off as to cause danger, inconvenience or damage to any person or environment.
- (f) All unused scaffoldings, surplus/scrap materials and equipment/ systems like temporary electrical panels etc. should not be allowed to accumulate and shall be removed from the premises at the earliest.
- (g) Accumulation of water/oil spillages on the floor or any other workplace should be avoided.
- (h) Proper aisle space marking should be provided in all workplaces.

4.21 Other Statutory Provisions

Notwithstanding the clauses in the above subsections, there is nothing in these clauses to exempt the Facility from the provisions of any other act or rules in force in the Republic of India. In particular, all operations involving the transport, handling, storage and use of explosives should be as per the standing instructions and conform to the Indian Explosives Act, 1884 and the Explosives Rules, 1983. Handling, transport, storage and use of compressed gas cylinders and pressure vessels should conform to the Gas Cylinder Rules 2004 and Static and Mobile Pressure Vessels (Unfired) Rules 1981. In addition, The Indian Electricity Act 2003 and Indian Electricity Rules 2005, the Atomic Energy Act, 1962, the Radiation Protection Rules, 2004, the Atomic Energy (Factories) Rules, 1996 and AERB safety manual on 'Radiation Protection for Nuclear Facilities' (AERB/NF/SM/O-2) should be complied with.

5. PERSONAL PROTECTIVE EQUIPMENT

5.1 General

Although the primary approach in any safety effort is that the hazard to the workmen should be eliminated or controlled by engineering methods rather than protecting the workman through use of personal protective equipment (PPE). Engineering methods could include design change, substitution, ventilation, mechanical handling, atomisation etc. Under those situations when it is not possible to introduce any effective engineering methods for controlling hazards, it is necessary that workman use appropriate type of PPE. For example, in construction work there is the possibility of a hand tool, a bolt, or some loose material to fall from an elevated level and striking the head of workman working below. It is therefore necessary that construction worker wear a safety helmet. It is for such situations, both the Factories Act 1948 and the Atomic Energy (Factories) Rules, 1996 have provisions for use of appropriate type of PPE.

It is thus recognised that use of PPE is an important and necessary consideration in the development of a safety programme. Once the safety professional decides that PPE is to be used by workmen, it is essential to select right type of PPE and management should ensure that workman uses it and also PPE is correctly maintained.

5.2 Personal Protective Equipment (PPE)

- (a) All personal protective equipment as considered necessary should be made available for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also adequate steps should be taken by engineer-in-charge to ensure proper use of PPE.
- (b) All the PPEs in use should be as per relevant IS standards as referred in the AERB safety guidelines on 'Personal Protective Equipment' (AERB/SG/IS-3).
- (c) All persons employed at the construction site should use safety helmets. Safety helmet should be with BIS mark and should have its headband with back support and chin strap.
- (d) Workers employed on mixing asphaltic materials, cement and lime mortars should use protective goggles, protective foot wears, hand gloves and respirators as required.
- (e) Persons engaged in welding and gas-cutting works should use suitable welding face shields. The persons who assist the welders should use suitable goggles. Protective goggles should be worn while chipping and grinding.

- (f) Stonebreakers should use protective goggles. They should be seated at sufficiently safe distances from one another.
- (g) Safety goggles should be of shatterproof type and with zero power.
- (h) Persons engaged in or assisting in shot blasting operations and cleaning the blasting chamber should use suitable gauntlets, overalls, shatterproof and dust-proof goggles and self contained breathing apparatus set.
- (i) All persons working at heights more than 3.5 m above ground or floor and exposed to risk of falling down should use full body harness safety belts, unless otherwise protected by cages, guard railings, etc. In places where the use of safety belts is not feasible, suitable net of adequate strength fastened to substantial supports should be used.
- (j) When workers are employed in sewers and inside manholes that are in use, it should be ensured that the manholes are opened and are adequately ventilated at least for an hour. After it has been well ventilated, the atmosphere inside the space should be checked for the presence of any toxic gas or oxygen deficiency by a competent person and recorded in the register before the workers are allowed to get into the manholes. A pilot team should enter the area donning self contained breathing apparatus (SCBA). The manholes opened should be cordoned off with suitable railing and provided with warning signals or caution boards to prevent accidents. There should be proper illumination in the night. Depending upon the work situation, the facility should provide PPE including the SCBA as recommended by Head, industrial safety.

6. MEDICAL MANAGEMENT

6.1 General

- (a) The facility management/contractor shall make arrangements for the first aid and medical services for the injured or ill persons for prompt attention or aid.
- (b) The arrangement can be made by the contractor or an agreement can be in vogue with the facility .
- (c) The medical facilities at first-aid centre shall be adequate to immediately cater to the injured based on the hazard potential and probable severe injuries.
- (d) The first aid centre shall be provided with the adequate equipment and medicines for catering to the site requirements. The first aid centre shall be manned depending on the working hours/on round the clock shift basis. The services of at least one qualified medical practitioner (medical officer) shall be made available by the Facility management/contractor.

6.2 Medical Facilities

- (a) Medical facilities conforming to the provisions of the Atomic Energy (Factories) Rules, 1996 should be provided at all work sites.
- (b) The requisite medical facilities in the form of a well-equipped first aid centre manned by qualified nursing personnel should be provided at all work sites. Contractor may avail this facility as per terms and conditions of the contract.
- (c) In addition, well-maintained first aid boxes should be kept at each location of the work by the Facility/contractor and availability of the personnel trained in first aid should be ensured.
- (d) A manned and equipped ambulance should be available at work site during the working hours/on round-the-clock shift basis.
- (e) It should be ensured by the occupier that occupational health monitoring of contract workers is carried out as per provisions of the Factories Act 1948 as per the latest amendment and the stipulations/directions given by Atomic Energy Regulatory Board from time to time.
- (f) Display of emergency contact numbers of important persons and hospitals and route map of site shall be maintained at designated places.

6.3 Medical Management of Serious Injuries

- (a) In case of serious injuries, the injured should be shifted to the nearest first-aid centre at site immediately. The opinion of medical officer/certifying surgeon should be sought immediately for medical management.
- (b) After providing the first aid treatment the injured should be shifted to designated medical facility of the site/hospital for further medical assistance, in an ambulance along with a nursing attendant.
- (c) The doctor at the medical facility of the site/hospital attending the case shall assess the extent of injuries and render immediate medical aid. If the situation warrants trauma/special care the injured shall be shifted to the referral hospital, having all the requisite facilities for specialised treatment in ambulance along with a medical attendant.
- (d) A list of such referral hospitals for specialised medical management facilities for the injured persons should be available with the project management/Head, industrial safety and Head, medical services of the site for ready reference.

APPENDIX-A

APPLICATION FOR HEIGHT PASS

PART- A

Group/Section: _____

Agency: _____

1. Applicant's Name : _____
2. Facility address : _____
3. Residential address : _____
4. Age : _____
5. Sex : _____
6. Height : _____
7. Gate Pass No. : _____
8. Name of contractor/agency with whom engaged at present : _____
9. Height pass required for work at _____ m. Height
10. Description of present job : _____
11. Previous experience of working at height : _____

S.No.	Name of the Employer	Duration of Employment	Work Experience
1.			
2.			

12. Does the applicant suffer from any of the following ailments? (If yes details to be given):
 - (a) Blood pressure _____ (b) Epilepsy _____
 - (c) Flat foot _____
 - (d) Frequent headache or reeling sensation _____
 - (e) Mental depression _____ (f) Limping gait _____
 - (g) Aerophobia _____

Declaration:

I hereby declare that the above information furnished by me is true and correct. I shall always wear the safety belt and tie the life-line whenever working at unguarded heights of 3 m and above. I shall not misuse the height pass issued to me or transfer it to any other person. I shall never come to duty or work at height/depth under the influence of alcohol/drugs.

Date:

Name:

Sign:

(Applicants name and signature or loss time injury (L.T.I) incase he cannot sign. In case of LTI an authorised person shall explain each point/item to the individual and certify on that behalf below the LTI)

I certify that I am satisfied with the above certification of the individual for the application of height pass and request for issue of height pass to him.

Name :

Sign :
(Agency Concerned)

Countersigned by:

Section Head (Facility)

PART- B

MEDICAL FITNESS CERTIFICATE

Certified that I, Dr. _____ have examined Shri _____
_____ aged _____ on (date) _____ who has signed
below in my presence. General & physical examinations of Shri. _____
_____ do not reveal any abnormality. He does not suffer from any acute/
chronic skin disease or any contagious or infectious disease. His eye sight is normal
with/without glasses. In my opinion, Shri _____ is physically
and mentally fit for working at height.

Details of examinations are given below:

Personal attributes:

1. Height: _____
2. Chest: _____
3. Weight: _____
4. Hearing: _____
5. Sight: _____
6. Skin: _____
7. Heart beating: _____

Medical aspects:

1. Urine: _____
2. Blood pressure: _____
3. Epilepsy: _____
4. Flat foot: _____
5. Frequent headache
or reeling sensation: _____
6. Mental depression: _____
7. Limping gait: _____
8. Aerophobia: _____

Name:

Sign :

Rubber Stamp of
Medical Practitioner
with Reg. No.

Signature of workman:

PART-C

INDUSTRIAL SAFETY SECTION

(Considering the above medical certificate, the applicant has appeared on the following practical tests conducted by industrial safety section and the results are given below (strike off whichever is in-applicable))

- (a) Wearing a safety belt and tying the rope knot : Pass/fail
- (b) Walking over a horizontal structure at 3 m. : Pass/fail
height wearing a safety belt
- (c) General physique (OK/Not OK)

The above applicant's performance in the above tests has been satisfactory/unsatisfactory due to the following.

So I certify and issue this height pass to Shri _____
with Registration No. _____ in the height pass register. This is valid for one year
from the date of issue i.e. up to _____

Date:

Name:

Sign.:

Scientific Assistant (Safety)

Safety Officer

APPENDIX-B

FORM - 1

APPLICATION FOR TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION [Prescribed under clause 4.6(d)]

1.	Name and address of user.	
2.	Reference of tender or work order (if applicable)	:
3.	Name & designation of tender/work order issuing authority.	:
4.	Power supply application number [†]	:
5.	Name and designation of tender/work order/work supervising authority (engineer-in-charge).	:
6.	Expected date of commencement of temporary supply	:
7.	Expected date of decommissioning of temporary supply	:
8.	Voltage level (LV/MV/HV)	
9.	Type of connection (1Ph/3Ph)	
10.	Connected load (Kw)	
11.	Maximum demand (KVA)/Power factor	
12.	Single line diagram* of proposed power distribution scheme along with equipment data sheet (downstream installation after point of connection).	Enclosed (Form-1A)/Not enclosed
13.	Name of overall supervisor and available qualified Staff	Enclosed (Form-1B)/Not enclosed
14.	Auxiliary equipment data sheet (meters, fire extinguisher, first aid box etc)	Enclosed (Form-1C)/Not enclosed
15.	Name and designation of provider's representative to whom the application is addressed.	:
16.	Name and designation of authorized signatory of user, who had submitted this application	:

[†] Power supply application number shall be different for same user with multiple applications for temporary supply

* All the drawings and tables shall be signed by user's representative indicated against 16 above.

Signature of authorised signatory of user

Signed endorsement of work order
supervising authority indicated
against 5 above.

FORM - 1A

**EQUIPMENT DATA SHEET FOR OBTAINING TEMPORARY POWER
SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING
CONSTRUCTION**

(Prescribed against item-12 of form-1)

Name and address of user:

Power supply application

Number:

Amendment No:-

References:- Single line diagram (SLD) of the power distribution scheme with all equipment details (Attach the SLD)

1. Identity	2. Type	3. Make & model	4. Manufacturer's S.No	5. Fixed/ Portable	6. Size	7. Last used date	8. Last test date	9. Latest test data	10. Rating

Signature of authorised signatory of user

Explanation of column headers:

1. Identity:- Identification mark/number/tag of equipment in single line drawing and layout drawing. Every equipment in single line drawing and layout drawing shall have suitable identification mark/number/tag.
2. Type:- Cable/CB/MCB/MCCB/ELCB/transformer/lightning arrestor/earthing station/earthing connection/motor/lighting fixture/switch/fuse/switch, socket box etc.
3. Make and model:- manufacturer's name and corresponding model no.
4. Manufacturer's S. No:- serial number and date in name plate if available. Else NA
5. Fixed/portable:- Equipment is installed/laid/anchored to surface or portable.
6. Size:- depending upon type of equipment and as desired by provider representative e.g. length for cables or all dimensions if heavy equipment like transformer.
7. Last used date. date of last use else NEW
8. Last test date. latest test date by user or by manufacturer if NEW
9. Latest test data:- IR, HV, resistance, functional test data depending upon the type of equipment as desired by provider's representative.
10. Rating:- name plate rating of equipment like voltage, current, power (apparent, active, reactive), IP of enclosure, size(cable cross section) etc. depending upon the type of equipment and as desired by provider's representative.

FORM - 1B**STAFF DATA SHEET FOR OBTAINING TEMPORARY POWER SUPPLY
AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION
(Prescribed against item-13 of form-1)**

Name and address of user:

Power supply application**Number:****Amendment No:-**

1. Name	2. Address	3. Tel.No.	4. Responsibility	5. Certification detail	6. Resuscitation training	7. Expe- rience	8. Other relevant training	9. Signature

Signature of authorised signatory of user

Explanation of column headers:

1. Name:- Name of agency/person
2. Address:-
3. Tel No:- regular, alternate and emergency telephone numbers
4. Responsibility:- whether responsible for installation, operation, maintenance, overall supervision etc. overall supervisor shall be indicated specifically.
5. Certification detail:- (a) type of certification e.g wire man license, electrical supervisor license, electrical contractor license, diploma in electrical engineering, degree in electrical engineering etc. (b) certifying agency e.g. state PWD, central PWD, CEA, name of college/university etc. (c) certificate/license number with date. (d) valid up to date or next renewal date must for contractor/supervisor license.
6. Artificial resuscitation training:- indicate YES/NO if the staff is trained to apply artificial resuscitation technique.
7. Experience:- number of years of experience.
8. Other relevant training :- any other training in electrical/safety course. Indicate name of training, duration (days/months), training providing agency.
9. Signature:- original signature of individual.

FORM - 1C

**AUXILIARY EQUIPMENT DATA SHEET FOR OBTAINING
TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY
AT WORK SITE DURING CONSTRUCTION
(Prescribed against item-14 of form-1)**

Name and address of user:

Power supply application**Number:****Amendment No:-****Reference:- Layout drawing No. / _____**

1. Identity	2. Type	3. Make and model	4. Manufacturer's S. No	5. Fixed/ Portable	6. Size	7. Last used date

Signature of user's representative

Explanation of column headers:

1. Identity:- identification mark/number/tag of equipment in layout drawing.
2. Type:- earthing rod/megger/multi meter/earth resistance meter/fire extinguisher/s and bucket/first aid box/resuscitation chart/rubber mat etc.
3. Make and model:- manufacturer's name and corresponding model no.
4. Manufacturer's S. No:- serial number and date in name plate if available. Else NA
5. Fixed/portable:- equipment is installed/laid/anchored to surface or portable.
6. Size:- depending upon type of equipment and as desired by provider representative.
7. Last used date. NEW for new equipment. NA for passive devices like chart/mat etc.

FORM-1D

[Prescribed under clause 4.6(e)]

Name of user agency

Power supply application number:-

CERTIFICATE BY THE LICENSED ELECTRICAL CONTRACTOR

Certified that subject installations have been carried out by us or checked by us and is in accordance with I.E. Rules. The documents submitted with subject temporary power supply application (Form-1) is verified by us and the complete installation confirms to these documents.

We shall periodically inspect/check the installation so that no unsafe situation arises during use of this temporary power supply system. We understand that for the entire duration of existence of this temporary power supply system we shall be responsible for any unsafe installation, operation, maintenance, testing of the same which results into any loss of life or material. We shall immediately report to the provider's representative and ensure de-energisation of supply if any unsafe situation arises during use of this temporary power supply system.

Signature of the authorised signatory of licensed electrical contractor

Rubber seal of licensed electrical contractor

Date

CERTIFICATE BY THE USER

Certified that my/our installations have been carried out in accordance with the I.E. Rules and that I/We have employed competent agency/staff to handle the installations which is strictly as per the staff data sheet submitted in Form-1B.

We understand that for the entire duration of existence of this temporary power supply system we shall be responsible for any unsafe installation, operation, maintenance, testing of the same which results into any loss of life or material. We shall immediately report to the provider's representative and ensure de-energisation of supply if any unsafe situation arises during use of this temporary power supply system.

Signature of the authorised signatory of user

Name of signatory

Date

FORM -1E

[Prescribed under clause 4.6(f)]

CERTIFICATE BY THE SAFETY OFFICER

Certified that I have inspected the electrical installation referred here in after satisfying myself about the safe condition of the installation, I hereby recommend that the service connection be given to the contractor.

Signature of the safety officer

Name:

Date:

AUTHORISATION BY THE ELECTRICAL ENGINEER

The subject power supply application along with completed installation, necessary certificates (as per Form-1 of Appendix-B) is scrutinised by us. The proposal found to be in order and the installation can be energised on _____ in presence of your designated overall supervisor as indicated in Form-1B. Enclosed herewith the test report data sheet Form-1F. You are requested to carry out the periodic testing of equipment and submit the test report periodically as per this form.

Signature of the electrical engineer
of provider

Name of signatory

Date

FORM - 1F

**TEST/MAINTENANCE REPORT DATA SHEET OF EQUIPMENTS OF
TEMPORARY POWER SUPPLY SYSTEM AT WORK SITE DURING
CONSTRUCTION
(Prescribed against form-1E)**

Name and address of user:

Power supply application**Number:****Amendment No:-**

1. Identity	2. Type	3. Last tested date	4. Next due date of any test	5 Frequency of IR test	6 Frequency of HV test	7. Frequency of earth resistance test	8. Other tests

Signature of electrical engineer of provider

Explanation of column headers:

1. Identity:- identification mark/number/tag of equipment in single line drawing and layout drawing. Every equipment in single line drawing and layout drawing shall have suitable identification mark/number/tag.
2. Type:- Cable/ CB/ MCB/ MCCB/ ELCB/transformer/lightning arrestor/earthing station/earthing connection/motor/lighting fixture/switch/fuse/switch, socket box etc.
3. Last test date: - latest test date indicated in Form-1A.
4. Next due date of any test:- as worked out by frequency of tests indicated in subsequent columns.
5. Frequency of IR test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
6. Frequency of HV test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
7. Frequency of earth resistance test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
8. Other tests: - name and description of any other essential tests/maintenance activity and required frequency depending upon type of equipment and location of installation. NA if not required after installation.

APPENDIX-C

CHECKLIST FOR OPERATION OF READY MIX CONCRETE (RMC) PLANT

(To be submitted to AERB along with application for construction consent and a copy to be retained by site)

(Verifiable documents like supplementary checklists, work sheets, spread sheets etc. should be maintained for each item of the checklist wherever relevant)

Serial No.	Points to be Checked	Remarks
1. 0	Prior to Installation of the RMC Plant	
1.1	Whether acceptance report on healthiness of the pre-identified critical plant equipment like concrete mixer, pumps, programmable logic controllers, conveyors, etc. prior to installation available ?	
1.2	Whether approval for the location of the plant site after evaluation and review by project management available ?	
1.3	Whether review of the vendor documents like operation and maintenance manual, vendor specifications, safety manual, etc. of contractor carried out by project management ?	
1.4	Whether job hazard analysis reports, erection procedures, checklists for critical activities available ? Are the operators aware of it ?	
1.5	Whether adequate number of line managers/supervisors/operators for carrying out the jobs safely are identified and availability is ensured ?	
1.6	Whether safety surveillance requirements of construction activities both by contractor and facilities clearly spelt out?	
1.7	Whether adequate work control measures like construction permit, safety work permit system, height pass system, etc. for safe job performance are available ?	
1.8	Whether any facilities officer is assigned the responsibility of the RMC Plant ?	
2.0	Commissioning/Operation of RMC Plant	
2.1	Whether reports on healthiness of material handling equipment like hoists, belt conveyors, buckets, hoses, including electrical equipment etc. are available ?	

APPENDIX-C (CONTD.)

CHECKLIST FOR OPERATION OF READY MIX CONCRETE (RMC) PLANT

Serial No.	Points to be Checked	Remarks
2.2	Whether machine guards for pulleys, power shafts, rollers, etc. are available ?	
2.3	Whether availability of safe operating procedures, emergency procedures, process diagrams, power supply diagrams, details of interlocks, operation & maintenance manual (provided by supplier/vendor) ensured ?	
2.4	Whether adequate number of qualified, trained and experienced operators for safe operation of the plant including mechanism/method of operational control and command available ?	
2.5	Whether periodic surveillance programme for equipment, logics, interlocks, process parameters, trips, noise and illumination levels, etc. and measures to take corrective actions are available ?	
2.6	Whether periodic checks are carried out to ensure display of all interlocks and warning signals in PLC monitor ?	
2.7	Whether operations control measures like log sheets, work permits, procedures, instruction sheets, by-passing/jumpering trips, etc. are available ?	
2.8	Whether access to medical first-aid box & fire extinguishers, etc. available ?	
3.0	Operating/Working Areas	
3.1	Control Room	
3.1.1	Whether adequate information on process equipment and parameters, logics and control available ?	
3.1.2	Whether clear view of the plant from the control room to check entry of personnel into operating areas is available ?	
3.1.3	Whether availability of distinct window panels to distinguish process parameters, alarms and trips are verified ?	
3.1.4	Whether audio alarm is available in the field to give warning prior to starting of concrete mixer & conveyor belt ?	
3.1.5	Whether relevant operating and maintenance documents available and accessible ?	

APPENDIX-C (CONTD.)

CHECKLIST FOR OPERATION OF READY MIX CONCRETE (RMC) PLANT

Serial No.	Points to be Checked	Remarks
3.1.6	Whether operational controls preventing re-setting of operational parameters, trips by-passing, logic changes, etc. are available in control room ?	
3.1.7	Whether operational data and information logged chronologically indicating the status of equipment running & shutdown, maintenance works planned and taken up.	
3.1.8	Whether means of communication between operator and control room are available ?	
3.2	Aggregates Storage/Handling Areas	
3.2.1	Whether aggregates/materials stored separately in suitable weatherproof enclosures ?	
3.2.2	Whether routes for movement of vehicles clearly defined ?	
3.2.3	Whether reverse horns, rear view mirror, etc. on all dumpers/ trailers/trucks are provided ?	
3.2.4	Whether machine guards for rotating/moving/conveying machines available in place ?	
3.2.5	Whether engineered noise control measures available in the crushing areas ?	
3.2.6	Whether usage of ear muffs for ear protection in noisy areas enforced ?	
3.2.7	Whether trip/emergency stop switch/pull cord mechanisms, etc. to the moving/rotating equipment like belt conveyors, crushers etc. are available and healthy ?	
3.2.8	Whether adequate dust control measures in working areas available ?	
3.2.9	Whether adequate illumination is provided in the working areas ?	
3.2.10	Whether safety/warning sign boards available to prevent persons approaching operating crushers/belt conveyors etc ?	
3.3	Storage Hoppers/Silos	
3.3.1	Whether suitable access with handrails to reach to the top of hoppers/silos provided ?	

APPENDIX-C (CONTD.)

CHECKLIST FOR OPERATION OF READY MIX CONCRETE (RMC) PLANT

Serial No.	Points to be Checked	Remarks
3.3.2	Whether proper walk ways with guard railing to access to different storage areas available ?	
3.3.3	Whether measures to prevent clogging of equipment like air fluidiser, etc. are available ?	
3.3.4	Whether controls and safety measures for feeders like belt conveyors to the silos/hoppers, etc. is available ?	
3.3.5	Whether dust suppression and noise control measures are in place ?	
3.3.6	Whether safety measures to enter into silos/hoppers for operation/maintenance requirements.	
3.3.7	Whether safe access for sampling locations/areas and procedure for collecting the samples are available ?	
3.4	Concrete Mixer Areas	
3.4.1	Whether safe access and working platform in mixing area provided ?	
3.4.2	Whether safe condition of the mixers, pumps, etc. used in the areas is ensured ?	
3.4.3	Whether proper identification tags for equipment, pipelines etc. are available ?	
3.4.4	Whether safe condition of the electrical equipment like local push buttons, panels, cables etc. ensured ?	
3.4.5	Whether adequate illumination in the working areas is ensured ?	
3.4.6	Whether interlocks of Mixers are in healthy state ?	
3.4.7	Whether sand bin is provided with electro-mechanical vibrator for easy material flow ?	
3.4.8	Whether warning signals to prevent persons approaching operating mixers in place ?	
3.4.9	Whether proper storage of admixtures to prevent freezing and availability of material safety data sheets for admixtures and other chemicals are ensured ?	
3.4.10	Whether collection trays have been provided under overhead conveyor belt to prevent fall of material ?	

APPENDIX-C (CONTD.)

CHECKLIST FOR OPERATION OF READY MIX CONCRETE (RMC) PLANT

Serial No.	Points to be Checked	Remarks
3.4.11	Whether the mixing cylinder/drum has emergency manual discharge facility ?	
4.0	Electrical Safety	
4.1	Whether proper isolating switches/isolators are provided for all equipment in the field as well as in control room ?	
4.2	Whether proper grounding/earthing arrangement for all electrical installations metallic structures and panel boards provided and recording of earth pit resistance values planned ?	
4.3	Whether fuses of adequate rating are available to limit overloading of circuits ?	
4.4	Whether earth leakage circuit breakers in all circuits are provided and tested periodically to ensure their healthiness ?	
5.0	Particulate Emissions	
5.1	Whether provisions of measurement of particulate emissions are available ?	
5.2	Whether actions to be taken in case of more visual emissions are available ?	
5.3	Whether methods to prevent/control spread of dust in working areas available ?	
6.0	General Requirements	
6.1	Whether emergency services like fire station, first aid, hospital etc accessible ?	
6.2	Whether specific line staff/supervisors for carrying out routine, special and emergency works with certain instructions and communications identified and trained ?	
6.3	Whether do's and don'ts while handling refrigerants like ammonia and admixtures used in concrete mixing displayed promptly ?	
6.4	Whether the use of personal protective equipment like helmet, safety belt, self contained breathing apparatus/canister, hand gloves, apron, face shield, safety shoes, gumboots etc. has been ensured ?	

APPENDIX-C (CONTD.)

**CHECKLIST FOR OPERATION OF READY MIX CONCRETE
(RMC) PLANT**

Serial No.	Points to be Checked	Remarks
6.5	Whether emergency procedures to be followed during ammonia leaks, fires, etc. are available ?	
6.6	Whether fire extinguishers are available at various critical locations ?	

PART-B
CONTROL OF WORKS
(CONTRACTORS)

7. INTRODUCTION

7.1 General

The Department of Atomic Energy(DAE) through its constituent units execute various site works either by their own manpower or by manpower of various outside agencies. The nature of contracts with outside agencies can be works contracts, engineering procurement contracts, purchase contracts, minor fabrication contracts etc. These site works involve entire gamut of conventional industrial activities like excavation, rock blasting, earth handling, construction, material handling, fabrication, installation, operation, maintenance etc. of nuclear or conventional plants/facilities. This is a challenging responsibility for the contractor due to the complexity of problems like quality of workforce (which may be unskilled, illiterate, migratory) available for labor-intensive jobs, lack of coordination among agencies at site, lack of safety awareness among concerned authorities, time schedules of project etc. As a principal employer, facility management shall be responsible to ensure health and safety of all personnel engaged for the work. In this process, the contractor through his established measures shall ensure that the guidelines are implemented. However the facility management shall monitor the compliance with the provisions outlined in the guidelines through periodic supervision and review. Any accidental injury or loss of life is detrimental to the facility as well as the society. This ‘guidelines’ covers the safety organisation and the safety management system requirements in sections two and three. The work specific safety precautions are covered in section four. The requirements relating to personal protective equipment and medical management are covered in sections 5 and 6.

7.2 Objective

This ‘guidelines’ has a basic framework of industrial safety organisation, safety management systems, safe work procedures to maintain a safe working environment for all personnel and to prevent any unsafe condition/act endangering the life of personnel engaged for industrial activities. The major objectives of this ‘guidelines’ are:

- (i) To create awareness among workers about industrial hazards and safe working procedures.
- (ii) To lay down safe work procedures and systems to be followed for different type of industrial activities.
- (iii) To establish a robust safety management system.
- (iv) To protect the health and ensure the safety of the workers from industrial activities.

7.3 Scope

This 'guidelines' is essential for implementation and assurance of conventional safety in areas such as industrial, chemical, electrical, fire, environmental and is applicable for all works executed through contracts, like engineering procurement contract, minor fabrication contract etc. Where the execution of work is envisaged in radiation controlled area or involves handling and fabrication of any nuclear material, additional precautions noted in relevant AERB safety documents on radiation protection shall also be applicable.

8. SAFETY ORGANISATION

8.1 General

- (a) Construction projects have significant health and safety hazards, which need to be managed systematically since the project inception stage to achieve incident-free completion of jobs. Contractor should have well-defined safety organisation which helps in effective implementation of safety management systems and ensures health and safety of workers.
- (b) The top management of contractor should assure that all the provisions of relevant Acts & Rules are conformed to.
- (c) Safety organisation should carry out safety surveillance, safety training, safety enforcement measures, safety audit etc. related to all works to fulfill the overall safety requirements of this 'guidelines'.
- (d) Safety functionaries should be exclusively assigned with the work related to protection of health and safety of workers.
- (e) IS: 18001: 2007 gives detailed requirements of health and safety management system requirements. IS: 15793 gives requirements of good practices for managing environment, occupational health and safety legal compliance. This 'guidelines' prescribes requirements in addition to IS: 18001:2007 and IS: 15793 and gives guidelines on implementing these specific to a construction project.
- (f) The requirements prescribed in various central and state regulations including *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996* and rules framed thereunder with respect to managing health and safety in construction projects, shall be complied with.

8.2 Organisational Structure for Safety Management

- (a) The Contractor shall deploy qualified and experienced line management personnel for supervising the jobs to be carried out safely by workers. In order to oversee the industrial and fire safety aspects during execution of hazardous jobs (listed out in para 9.11) by the contractors, at least one safety supervisor with the qualifications and experience mentioned in Table -2 shall be in place irrespective of the man power deployed by the contractor.
- (b) The qualification, experience and the minimum number of safety professionals to be deployed by contractor shall be as per the following table:

**TABLE-2 : QUALIFICATION, EXPERIENCE AND NUMBER OF
SAFETY PROFESSIONALS FOR CONSTRUCTION
PROJECTS**

Category of safety person	Mandatory requirement	Qualification
Safety officer	One in each shift (minimum) up to 1000 workers. If number of workers in a shift (including contractor's workers) exceeds 1000, additionally one safety officer should be deployed for every 1000 workers or part thereof.	Degree in engineering/ technology and diploma in industrial safety with minimum two years of experience or Diploma in engineering with diploma in industrial safety with minimum 6 years experience or A recognised degree in physics or chemistry and has practical experience of working in a factory in a supervisory capacity for a period of not less than 5 years. Notwithstanding the provision contained in the above criteria any person who (i) possesses a recognised degree or diploma in engineering or technology and has had experience of not less than five years in a department of the central or state government which deals with the administration of the Factories Act, 1948 or the Dock Workers (safety, health and welfare) Act, 1986 (54 of 1986) or (ii) Possesses a recognised degree or diploma in engineering or technology and has had experience of not less than 5 years, fulltime on training, education, consultancy, or research in the field of accident prevention in industry or in any institution, shall also be eligible for appointment as a safety officer:

**TABLE-2 : QUALIFICATION, EXPERIENCE AND NUMBER OF
SAFETY PROFESSIONALS FOR CONSTRUCTION
PROJECTS (CONTD.)**

Category of safety person	Mandatory requirement	Qualification
		Provided that competent authority may, subject to such condition as it may specify, grant exemption from the requirement of this sub rule if in its opinion, a suitable person possessing the necessary qualification and experience is not available for appointment.
Safety supervisor	One in each shift (minimum) up to 500 workers or One Supervisor for any hazardous job (listed in para 9.11) if, carried out by Contractor irrespective of number of workers. If number of persons working in a shift (including the contractors' workers) exceeds 500, additionally one safety supervisor should be deployed for every 500 workers or part thereof.	Diploma in engineering and diploma in industrial safety

9. SAFETY MANAGEMENT

9.1 General

The construction agencies (contractors) shall be asked to submit a project specific health and safety plan (construction safety management plan) proposing the methodology for managing health and safety and their capability in completing the project in a safe manner.

9.2 Safety Policy

- (a) The facility and the construction agency jointly or separately shall have a written statement prescribing the health and safety policy of the organisation. The health and safety policy conveys the management commitment and intent of the organisation towards health and safety, its organisation and arrangements to ensure that the set objectives are met. It also provides a framework for establishing, maintaining and periodically reviewing health and safety objectives and targets.
- (b) Health and safety policy shall meet the requirements of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act*, 1996 and IS 18001.
- (c) The policy shall be communicated to all stakeholders through display and other means. The policy shall be displayed in local language(s) which may be understood by majority of the workmen.

9.3 Safety Plan

- (a) A project specific health and safety plan shall be developed by the contractor and approved by the facility. On approval by the facility, health and safety plan shall be reference document for implementation, control and monitoring of health and safety aspects of the project by the Contractor.
- (b) Project health and safety plan shall describe how the project specific health and safety objectives and targets shall be achieved. It shall define the road map for achieving the standards that an organisation lays down for itself so that efforts can be coordinated, synergized and monitored.
- (c) Health and safety plan shall explain the means of establishing a positive health and safety culture at the project site. Health and safety plan shall identify and enumerate the control measures to mitigate the risks to the project completion arising out of health and safety issues so that the project is allowed to proceed without interruption and executed as per schedule.

Salient aspects that may be covered in the project health and safety plan are:

- (i) Project specific health and safety objectives, targets and programmes in line with health and safety policy.
- (ii) Hazard identification and risk assessment
- (iii) Meeting legal and other requirements
- (iv) Health and safety organisation
- (v) Resources, roles, responsibility and authority
- (vi) General health and safety rules
- (vii) Health and safety requirements to be followed by sub-contractors
- (viii) Operation control procedure
- (ix) Activities requiring work permit system and its procedure
- (x) Management of traffic safety inside the project
- (xi) Access control of employees
- (xii) Safety of visitors
- (xiii) Management of critical activities such as work at height, material handling, working with plant and machinery, etc.
- (xiv) Safe handling of chemicals, explosives, gas cylinders, electrical equipment etc.
- (xv) Ensuring the competency and awareness of the workmen
- (xvi) Fire prevention and fire fighting plan
- (xvii) Emergency preparedness and response plan
- (xviii) Traffic management plan
- (xix) Training matrix
- (xx) Personal protective equipment matrix
- (xxi) Health and safety performance monitoring measures such as inspection and audit
- (xxii) Incident reporting and investigation procedure
- (xxiii) Proactive and reactive indicators of health and safety
- (xxiv) Reward and reprimand for health and safety performance
- (xxv) Checklist and formats.
- (xxvi) Health monitoring plan for employees/workers exposed to hazardous jobs.

- (d) The risk control measures identified shall meet the provisions of *Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996*, other legislations and provisions of various safety related standards.
- (e) Procedures shall be established for timely recording and reporting of information required for continual improvement of health and safety performance.

Internal reporting procedures shall cover:

- (i) Incident reporting
- (ii) Non-conformance reporting
- (iii) Health and safety performance reporting
- (iv) Hazard identification reporting

External reporting shall cover

- (i) Statutory reporting requirements

The recording of reporting of health and safety performance shall be clearly documented in the health and safety plan.

9.4 Roles, Responsibility and Authority

- (a) Contractor shall define, document and communicate the roles, responsibilities and authorities of all personnel who manage, perform and verify activities having an effect on health and safety risks. It shall also include subcontractors and visitors.
- (b) The line management personnel who are responsible for execution of activities are directly responsible for health and safety in the work under their control.
- (c) Health and safety group and health and safety officers are responsible for guiding the top management of their own organisation on health and safety issues and facilitating the implementation of health and safety in the project site. For duties and responsibilities of health and safety officers refer Atomic Energy (Factories) Rules-1996.
- (d) Health and safety supervisors shall be engaged to assist the health and safety officers in performing their duties.
- (e) Management shall provide adequate resources essential to effectively manage the health and safety management system requirements of the project.

9.5 Design and Engineering

- (a) Design drawings, construction methodology and plans shall be reviewed to determine whether any additional risks may arise during the construction due to the features in the design or methodology.

Attention shall be paid to:

- (i) Providing permanent hooks and loops for tying safety slings of workers
 - (ii) Providing holes or such arrangements to the structure to which safe working platforms and safety nets can be connected
 - (iii) Laying permanent slings, grab rails/bars to be used by the workers
 - (iv) Permanent provision for attaching railings
 - (v) Provision for alternative access to the trapped or distressed workers
 - (vi) Provision for communication
 - (vii) Design facilitating barricading of the area around work site without causing hindrance to building functional activities
 - (viii) Durability of such safety related permanent design integrated elements
 - (ix) Other safety practices required for the type of works involved
 - (x) Significant risks from construction materials, which cannot be avoided in the design.
- (b) Analysis of design and integration of safety measures, as described above, should be undertaken as value engineering through multi-stakeholder consultation, necessarily involving designers, owner/client, operation/maintenance management and construction agency.
- (c) While need for special work methodology and enabling infrastructure is considered to make conditions safe for construction, attention shall also be drawn to the safety during maintenance operations (including inspections which may be necessary before project commissioning as well as maintenance).
- (d) It shall also be ascertained whether it would be feasible (within the time and cost considerations) to erect necessary temporary enabling infrastructure. If, in the due assessment by the project manager, it is established that the design, as proposed, would continue to be unsafe during construction and maintenance operations unless special enabling infrastructure is created and work procedures specifically drawn, the design shall be reviewed.

9.6 Construction Planning

- (a) Prior to the start of construction work, detailed planning shall be carried out which may include:
 - (i) Identifying aspects of design that have bearing on health and safety during construction stage.
 - (ii) While scheduling the various activities of the construction, allowing adequate time to carry work in accordance with health and safety requirements.
 - (iii) Reviewing the proposed work method of various activities, identifying health and safety hazards of activities in the project and assessment of the risk level.
 - (iv) When the risk level is unacceptable, taking additional control measures including revision of the work methodology so that identified risk is at ALARP (As Low as Reasonably Practicable) level.
 - (v) Planning and establishing the facilities for implementation of health and safety such as workmen training facility, health centre for medical check-up and first aid, access control of employees, etc.
 - (vi) Ensuring that the temporary establishments at project site such as site offices, workmen camps, toilets, canteens and rest sheds, etc. are created meeting the requirements of the relevant statutes and standards.
- (b) Facility shall ensure that the construction agency has understood the challenges and has planned to meet the project specific health and safety requirement through appropriate competencies.
- (c) Health and safety measures need proper coordination by the construction agency and such efforts of the construction agency shall be reviewed, monitored and appropriately guided by the facility.
- (d) In respect of sub-contractors, project manager of the construction agency shall ensure that the sub-contractors meet the health and safety requirements of the project. Health and safety control and monitoring shall be established specific to the needs of the project.

9.7 Safety Communication

- (a) Procedures shall be established to communicate significant hazards and risks to and from employees and other interested parties. The health and safety hazards and risks may be communicated in the following ways:

- (i) Sharing of accidents case studies which occurred in the project site as well in other similar projects
- (ii) Safety induction and orientation training
- (iii) Health and safety posters and displays
- (iv) Health and safety campaigns and competition involving the employees
- (v) Sharing of results of the audits, inspections and other monitoring systems
- (vi) Establishing a system for collecting feedback on health and safety from employees and other interested parties
- (vii) Tool box meeting
- (vii) Safety signage.
- (b) Health and safety communications addressed to workmen shall preferably be in local language(s) understandable by majority of the workmen.
- (c) The facility and construction agency shall jointly endeavour to promote a positive health and safety culture at the project. Top management of the organisations should exhibit a visible management commitment and felt leadership towards health and safety. This shall be achieved by participating in health and safety programmes such as:
 - (i) Project health and safety committee meeting
 - (ii) Health and safety walk down
 - (iii) Including health and safety in all performance review meetings
 - (iv) Exhibiting a safe behaviour while at site.
- (d) The top management should clearly communicate that it considers safety as core value and it shall not allow it to get compromised. Such messages when it reaches down the level in the organisation enable to create a positive health and safety culture.

9.8 Safety Monitoring Programme

- (a) The objective of the safety surveillance programme should address assurance of effective implementation of safety measures in execution of works. Following surveillance programme should be in place at sites. The safety organisation should monitor, maintain record and follow up for corrective actions.

- (b) The surveillance programme should consist of identification of safety related deficiencies and status of corrections thereof, the implementation of protective measures, the safe work practices, human behavior etc.
- (c) Specific surveillance should be ensured with respect to testing of equipment, portable power tools, electrical equipment and tools, hand tools, surveillance of material handling equipment, transport equipment, earth moving equipment, gas cylinders, stores, etc. to comply with various statutory requirements.
- (d) Surveillance on safety awareness and training compliance including induction training, on the job training and refresher training, job specific pre-job briefing, job hazard analysis, etc. as per facility's guidelines should be ensured.
- (e) Safety related deficiencies (SRDs) shall be detected by any employees/worker of construction agency and communicated to the line manager for corrective actions. The corrective action shall be monitored and records shall be maintained.
- (f) Systematic updating of SRDs attended and pending should be made available by the contractor for verification of facility.
- (g) The health and safety performance monitoring and measurement procedures shall provide for:
 - (i) Both qualitative and quantitative measures appropriate to the project
 - (ii) Monitoring the extent to which project health and safety objectives are met
 - (iii) Proactive measures of compliance that measures compliance with health and safety plan, operational control procedures and legislation
 - (iv) Reactive measures of performance to monitor accidents, ill health, near misses and non-conformances
 - (v) Monitoring dangerous occurrences
 - (vi) Fire occurrences
 - (vii) First aid injuries.
- (h) Health and safety inspections shall be preferably conducted by a team of the concerned engineer, health and safety officer and area in-charge of the contractor.

- (i) The type of inspections that shall be carried out and the frequency shall be decided during the planning stage and documented in the project health and safety plan. The health and safety inspections should include:
 - (i) General site health and safety inspection
 - (ii) Electrical safety inspection
 - (iii) Plant and machinery inspection
 - (iv) Health and hygiene inspection
 - (v) Scaffolding safety inspection.
 - (vi) Portable tools and tackles
 - (vii) Lifting tools and tackles
 - (viii) Fire equipment inspections
 - (ix) Illumination level and noise level monitoring
- (j) Status of health and safety implementation shall be measured and monitored by several proactive indicators which include the following:
 - (i) Compliance level of project health and safety plan
 - (ii) Compliance level of health and safety observations with in the target date
 - (iii) Implementation status of training plan
 - (iv) Implementation status of corrective and preventive actions
 - (v) Compliance level of pre-employment medical checks and periodic medical checkups
 - (vi) Compliance level of legal and other requirements
 - (vii) Percentage of activities for which detailed project specific risk assessment is conducted.
- (k) Procedures shall be established to report, investigate and analyze incidents. The procedures shall involve:
 - (i) Members of the incident investigation team
 - (ii) Agencies to be reported in case of incidents
 - (iii) Time period within which incidents need to be reported
 - (iv) Methodology for investigation and determining the root cause of accidents.

These procedures shall form a part of the project health and safety plan and monitored on a regular basis for its effectiveness.

- (l) All incidents including near miss cases, accidents and dangerous occurrences shall be thoroughly investigated, direct and root causes determined and corrective action planned. Incidents may be analysed covering the following ways to prepare and implement an effective prevention plan:
 - (i) Body part injured
 - (ii) Age of the victims
 - (iii) Time of accidents
 - (iv) Causes of accidents
 - (v) Nature of injury.

For detailed guidelines on analysis of incidents and computation of injury rate refer IS 3786.

- (m) The following reactive health and safety indicators should be used to measure and monitor the health and safety performance of the project site:
 - (i) Number of near miss cases
 - (ii) Number of first aid cases
 - (iii) Lost time injury frequency rate
 - (iv) Lost time injury severity rate.
- (n) The health and safety performance of subcontractors shall be monitored on a regular basis and necessary directive and support shall be given to achieve the set health and safety objectives and targets.
- (o) All accidents leading to property damage/personnel injuries/fatal accident/near miss and dangerous occurrence should be reported to the facility's engineer-in-charge immediately
- (p) All 'near-miss' accidents should also be recorded/reported and investigated and recommendations arising out should be implemented on priority.

9.9 Training/Orientation

- (a) It shall be ensured that all employees are competent to perform the assigned work safely on the basis of appropriate education, training or experience. The competency requirements of different categories of employees shall be mapped and procedures shall be implemented to ensure that those deployed meet the competence requirements.

- (b) The objective of health and safety training shall be to equip the employee with necessary knowledge and skill to perform the work assigned to him in a safe manner, to foster continual improvement and to imbibe safety culture.
- (c) Preferably, the training should be carried out away from the working place of the participants to ensure focused attention on the training for both trainer as well as trainees.
- (d) After completion of training due procedure shall be followed for obtaining the feedback from the participants on the effectiveness of the training. Effectiveness of training imparted shall be monitored for continual improvement and necessary corrections in implementation.
- (e) The training/orientation programme should be implemented to meet the mandatory requirements. [Rule 43(2) (m) of the Atomic Energy (Factories) Rules 1996]. The training should be phased as follows:
- (f) Induction cum orientation training should include the overall safety aspects of the work and give a general overview of the various hazards, the particular activities and the do's and don'ts. As a part of training, workers should also be given demonstrations on use of personal protective equipment, first aid and fire-fighting equipment, fire mock drills, other emergency preparedness etc.
- (g) The line manager along with the safety representative should conduct pre-job briefing on day-to-day basis prior to specific hazardous jobs. This will make the workers aware of the hazards and the precautions to be taken.
- (h) Refresher training should be imparted to each worker at least once in a year.
- (i) A training schedule should be prepared by the construction agency and communicated to facility for concurrence.
- (j) Records of training, demonstration and pep talk should be maintained.

9.10 Permit to Work System

- (a) Activities requiring permit to work shall be decided before starting the construction and shall be suitably documented in the project health and safety plan. Some of the activities which shall require permit to work are:
 - (i) Excavation
 - (ii) Entry into confined spaces
 - (iii) Electrical work (HV/LV)

- (iv) Opening manholes, covers and grills
- (v) Blasting operation
- (vi) Hot work
- (vii) Work on plant and machinery and other power driven equipment
- (viii) Working at height
- (ix) Working at night
- (b) The contractor should establish a permit to work system for any other hazardous activity, which it feels necessary to be controlled administratively for safe execution.
- (c) Contractor should obtain valid safety work permit before carrying out any hazardous job and shall maintain a copy of it with him through out the period of his work. Record of safety work permit should be maintained in a systematic manner. All the safety conditions and requirements stipulated in the safety work permit should be ensured strictly.
- (d) Contractor should ensure that only authorized personnel are deployed for hazardous works/jobs (refer item 3.11 for hazardous job) and provide facilities for the same.

9.11 Job Hazard Analysis

- (a) It should be ensured by contractor that a safe work procedure exists for all the hazardous jobs as mentioned hereunder and the requirements of the safety procedures are ensured at the work sites. Job hazard analysis (JHA) should form a part of such safe work procedures. A checklist based on JHA should be prepared. This checklist should be crosschecked by the line managers and verified by safety officer.

Typical list of jobs requiring job hazard analysis (This list is illustrative only and not exhaustive) is as follows:

- (i) Excavation
 - (a) Blasting including under water blasting
 - (b) Earth and stone removal/backfilling/dumping of earth/stones
 - (c) Any excavation more than 1.8 m depth.
- (ii) Work at height (working beyond 3.5 meters above ground)
 - (a) Erection and dismantling of scaffolding, platforms, shuttering/de-shuttering work

- (b) Dome work, rod bending, construction of chimney and cooling towers
 - (c) Working on tower crane.
- (iii) Materials and material handling
 - (A) Critical equipment handling e.g.
 - (a) Calandria
 - (b) Steam generators
 - (c) Turbine generator components
 - (d) Diesel generator set
 - (e) Generator stator
 - (f) End shields
 - (g) Fuelling machines components
 - (h) Heat transport pumps etc.
 - (B) Hazardous chemical handling e.g.
 - (a) Acids and alkalis
 - (b) Ammonia
 - (c) Chlorine
 - (d) Freon
 - (e) Hydrazine
 - (f) Hydrogen sulphide
 - (g) LPG
 - (h) Morpholine
 - (C) Movement of heavy material by crane
 - (D) Movement of tractor trolley on slopes
 - (E) Manual lifting of heavy material to height
 - (F) Erection of heavy machinery, equipment.
- (iv) Electrical connection
 - (a) Field connection for electrical installation
 - (b) Installation of lighting fixtures
 - (c) Charging of electrical system
 - (d) Charging of transformer, switch yard, switch gears
 - (e) Working near high voltage lines
 - (f) Use of portable electrical tools.

- (v) Equipment/structural erection work
 - (a) Material handling
 - (b) Loading and unloading
 - (c) Transportation of material from one place to other
 - (d) Steel fabrication and erection
 - (e) Cleaning and maintenance of batching plant equipment.
- (vi) Finishing/painting work
 - (a) Painting at height
 - (b) Painting in confined space.
- (viii) Other specific work
 - (a) Work with pneumatic tools/compressed air
 - (b) Work on pressure vessels/lines
 - (c) Work in the vicinity of steam lines
 - (d) Work in high enthalpy area
 - (e) Work in high noise area
 - (f) Work in confined space including tunnels and trenches
 - (g) Work in isolated area (away from main site)
 - (h) Radiography work
 - (i) Work related to welding, gas cutting, grinding
 - (j) Working near conveyor, rotating machine
 - (k) Leak detection testing.

9.12 Reward

- (a) To motivate the employees and organisation to work safely measures can be implemented based on the suitability. Selection and rewarding for the following categories may be considered on regular basis:
 - (i) Safest workmen
 - (ii) Safest supervisor
 - (iii) Safest area
 - (iv) Safest sub-contractor, etc.
 - (v) Sub-contractors and employees may be rewarded when the project achieves significant million man-hours without any lost time injury.

10. WORK SPECIFIC SAFETY MEASURES

10.1 General

- (a) The contractor should ensure that safety precautions are taken during the execution of awarded work and work areas are maintained safe at all times. At the end of each shift and at all times when the work is suspended, it should be ensured that the work area is left safe in such a way that no materials and equipment that can cause damage to existing property, personal injury or interfere with the other works of the project or station are left in an unsafe manner.
- (b) The contractor should ensure to provide and maintain all lights, guards, fencing, warning signs, caution boards and other safety measures and provide for vigilance as and when necessary for the protection of workers and for the safety of others. The caution boards should also have appropriate symbols.
- (c) Adequate lighting facilities such as floodlights, hand lights and area lighting should be provided at the site of work, storage area of materials and equipment and temporary access roads within the working area.
- (d) All works should be planned so as to avoid interference with other facilities, works of other contractors or sub-contractors at the site. In case of any interference, necessary coordination should be ensured for safe and smooth working.
- (e) It should be ensured that the instructions given by the safety officer or his designated nominee regarding safety precautions, protective measures, housekeeping requirements, etc. are complied with. The safety officer with due intimation to line manager should have the right to stop the work, if in his opinion, proceeding with the work will lead to an unsafe and dangerous condition. Line manager should arrange to get the unsafe condition rectified and/or provide appropriate protective equipment.
- (f) Contractor should ensure that each job with a hazard whether small or big is intimated to the Head, industrial safety of the facility well before it is taken up.
- (g) The contractor should be fully responsible for non-compliance of any of the safety measures or requirements, implications, injuries, fatalities, dangerous occurrences and compensation arising out of such situations or incidents.

- (h) Maximum duty hours of an individual should be as per the Factories Act 1948 or its latest amendment.
- (i) Illumination levels should be as per the statutory requirements.

10.2 Rock Blasting

- (a) All blasting operations should be carried out on the basis of procedures approved by Head, industrial safety and engineer-in-charge. All works in this connection should be carried out as per BIS specification/code (IS 4081: 1986. Title:- Safety code for blasting and related drilling operations (First Revision)). Barricades, warning signs etc. should be placed on the roads/open area.
- (b) Blasting permit should be obtained from Head, Industrial Safety at least one day before the blasting operation and precautions mentioned there in shall be ensured by the engineer-in-charge before blasting operation.
- (c) The blaster should have a licence from competent authority under Explosive Rules, 1983 for blasting work. It should also be ensured that he knows about the risks involved.
- (d) Blasting should be done under the supervision of competent engineer/supervisor.
- (e) Blasting in the open site should only be carried out during fixed hours every day/fixed day in the week between sunrise and sunset. Residents of adjacent area should be informed in advance about the blasting schedule.
- (f) No blasting should be undertaken during thunderstorm.
- (g) Necessary precaution should be taken to ensure the stability/integrity/safety of the adjacent structure by limiting the peak particle velocity.
- (h) No loose material, such as tools, drilling equipment, etc. should be left on the surface to be blasted. Proper muffling arrangement of the blasting area should be ensured to avoid flying of blasted material.
- (i) Authorized blaster should personally ensure that all the personnel/equipment has been removed from the blasting area before the blasting operations.
- (j) Blasting area should be free of detonating gas, inflammable objects, sparking or damaged wiring system, stray currents and static electricity.
- (k) All electrical lines in blasting area should be de-energised.
- (l) Entry of unauthorized personnel should be prevented by displaying warning signs.

- (m) In case of misfire, no person should be allowed to approach the blasting site unless it is inspected and cleared by a competent engineer/supervisor.
- (n) Explosives and blasting material should be stored only in clean, dry, well-ventilated, suitably constructed bullet/magazine which should be fire resistant and securely locked. Stock book should be kept accurate and maintained. Licence should be obtained for storage of explosive as per the Explosives Act, 1884.
- (o) Blasting caps, electric blasting caps or primers and detonators should not be stored in the same box, container or room with other explosives.
- (p) Precautions against lightening should be provided in accordance with Indian Electricity Rules, 1956 (amended in 2000).
- (q) The explosives should be transported in specially designed vehicles bearing a special sign or inscription entitled 'DANGER-EXPLOSIVES'. Also detonators separated from other explosive should be transported in a separate compartment.

10.3 Excavation, Trenching and Earth Removal

- (a) Before taking up excavation work, necessary permission should be obtained from the engineer-in-charge with reference to existing underground services.
- (b) The Line manager of the works should exercise full care to ensure that no damage is caused by him or his workmen, during the operation/excavation etc., to the existing water supply, sewerages, power or telecommunication lines or any other services or works. He should provide and erect before construction, substantial barricades, guardrails, and warning signs around the work area. He should also furnish, place and maintain adequate warning lights, display board, signals etc., as required.
- (c) All trenches 1.2 m or more in depth should at all times be supplied with at least one ladder for every 30 m along the trench. Ladders shall extend from bottom of the trench to at least 1 m above the surface of the ground.
- (d) The sides of the trench/pit in soil, which are 1.2 m or more in depth should be stepped back to give suitable slope (angle of repose) or securely held by timber bracing or appropriate shoring/support, to avoid the danger of soil slides from collapsing. The excavated material should not be placed within 1.5 m or half of the depth of the pit whichever is more from edges of the trench/pit. Cutting should

be done from top to bottom. Under no circumstances mining or undercutting should be done.

- (e) Workers should not be exposed to the danger of being buried by excavated material or collapse of shoring. Measures to prevent dislodgment of loose or unstable earth, rock or other material from falling into the excavation by proper shoring shall be ensured.
- (f) The stability and safety of the excavation, adjacent structures, services and other works should be ensured.
- (g) All excavated area should be fenced off by suitable railing and installation of caution board to warn the persons from slipping or falling into the excavation pit/ mound.
- (h) All excavated areas shall have an illumination level of at least 20 lux for night work and a red danger light shall be displayed at prominent place near the excavation site to warn approaching traffic and men.
- (i) For removal of earth from an earth mound/excavated heap a written permission should be obtained from the engineer-in-charge of the work. As far as practical, earth should be removed mechanically. Wherever manual removal of earth is involved, earth should be removed from the top by maintaining a slope equal to the angle of re-pose of the earth. Such work should be constantly supervised to ensure that no undercutting is done and to ensure that no person is trapped.
- (j) Dumping of excavated soil should be done at a specified area under proper supervision with respect to signaling, illumination and safety clearance.
- (k) It should be ensured that at a construction site of a building or other construction work, every vehicle or earth moving equipment is equipped with (a) silencers, (b) tail lights, (c) power and hand brakes, (d) reversing alarm (e) search light for forward and backward movement, which are required for the safe operation of such vehicle or earth moving equipment and (f) the cab of the vehicle or earth moving equipment is kept at least one meter from the adjacent face of a ground being excavated. (g) indicator etc.
- (l) It should be ensured that when a crane or shovel is traveling, the boom of such crane or shovel is in the direction of such travel and the bucket or scoop attached to such crane or shovel is raised and without load, except when it is traveling downhill.
- (m) Before loading or unloading power trucks or trailers attached to tractors, the brakes should be applied and if vehicle is on a sloping

ground, the wheels should be blocked. Handcart should not be used for the transfer of construction/erection materials in the construction area. However if the exigency demands urgent transfer of light materials a small handcart may be permitted with the prior approval of the Engineer-in-charge.

- (n) It should be ensured that at a construction site of a building or other construction work:
 - (i) All transport or earth moving equipment and vehicles are inspected at least once in a week by responsible persons and in case any defect is noticed in such equipment or vehicle, it is immediately taken out of service.
 - (ii) Safe gangways are provided for to and fro movement of building workers engaged in loading and unloading of lorries, trucks, trailers and wagons.
 - (iii) All earth moving equipment, vehicles or other transport equipment be operated only by such persons who are adequately trained and possess such skills as required for safe operation of vehicles or other transport equipment.
 - (iv) Trucks and other equipment are not loaded beyond their safe carrying capacity, which should be clearly marked on such trucks and other equipment.
 - (v) No unauthorised person rides the transport equipment employed in such work.
- (o) It should be ensured at a construction site of a building or other construction work that:
 - (i) A shovel or an excavator whether operated by steam or electric or by internal combustion used for such work is constructed, installed, operated, tested and examined as required under any law for the time being in force and the relevant national standards.
 - (ii) Buckets or grabs of power shovels are propped to restrict the movement of such bucket or grabs while being repaired or while the teeth of such bucket or grabs are being changed.
- (p) It should be ensured at a construction site of a building or other construction work that:
 - (i) An operator of a bulldozer before leaving - applies the brakes, lowers the blade and ripper and puts the shift lever into neutral.
 - (ii) A bulldozer is parked on level ground at the close of the work.

- (iii) The blade of a bulldozer is kept low when such bulldozer is moving uphill.
 - (iv) Bulldozer blades are not used as brakes except in an emergency.
- (q) It should be ensured at a construction site of a building or other construction work that:
 - (i) A tractor and a scraper are joined safely at the time of its operation
 - (ii) The scraper bowls are propped while blades of such scraper are being replaced.
 - (iii) A scraper moving downhill is driven in low gear.
- (r) It should be ensured at a construction site of a building or other construction work that:
 - (i) Before a road roller is used on the ground, such ground is examined for its bearing capacity and general safety, especially at the edges of slopes such as embankments on such grounds.
 - (ii) A roller is not moved down hill with the engine out of gear.
- (s) Vehicle carrying excavated material should have proper cover over the driver's cabin.

10.4 Safe Means of Access/Platforms

- (a) Adequate safe means of access and exit should be provided for all work places, at all elevations.
- (b) Suitable scaffolds should be provided for workmen for all works that cannot be done safely from the ground, or from solid platform except such short duration work that can be done safely from ladders. Bamboo/wooden scaffolding should not be permitted.
- (c) Where the platform for working is more than 3.5 m above ground, the width of the platform should be minimum 1 m.
- (d) Ladder should be of rigid construction having sufficient strength for the intended loads. Wooden/bamboo/rope ladders should not be permitted. All ladders should be maintained in good condition. The ladders should be fixed to the ground or rigid platforms. An additional person should be engaged for holding the ladder, if ladder is not securely fixed. Ladder shall be extended from floor to at least one meter above the platform.

- (e) A portable ladder should be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical). Ladders should not be used for climbing while carrying materials in hands. While climbing both the hands should be free.
- (f) Any working platform on scaffolding or staging more than 3.5 m above the ground or floor should have a guard rail attached, bolted, braced at least 1.0 m high above the floor or platform of such scaffolding or staging along with mid-rail.
- (g) The planks used for any working platform should not project beyond the end supports to a distance exceeding four times the thickness of the planks used. The planks should be rigidly fixed at both ends to prevent sliding, slipping or tilting. The thickness of the planks should be adequate to take load of men and materials and should not collapse. Plywood or packing wood should not be used as planks.
- (h) The guardrail should extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of materials. Standard railing should have posts not more than 2 m apart and an intermediate rail halfway between the floor or platform of the scaffolding and the top rail. Such scaffolding or staging should be so fastened as to prevent it from swaying from the building or structure. Scaffolding and ladder should conform to IS 3696 (Part I): 1987 and (Part II): 1996.
- (i) Working platforms of scaffolds should have toe boards at least 15 cm in height to prevent materials from falling down.
- (j) A sketch of the scaffolding proposed to be used should be prepared and approval by the engineer-in-charge obtained prior to start of erection of scaffolding. All scaffolds should be examined by engineer-in-charge before use.
- (k) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or gangway or stairway is more than 3.5 m above ground level or floor level, they should have adequate width for easy movement of persons and materials and should be suitably guarded.
- (l) No single portable ladder should be used for access to a height of more than 4.5 m. For ladders up to 3m in length the width between styles (side bars)/width in the ladder should in no case be less than 300 mm. For longer ladders this width should be increased by at least 20 mm for each additional meter of length. Step/rungs spacing should be uniform and should not exceed 300 mm. Portable ladder should be used only for access to work place. In case work place is higher than 4.5 meters, pre-fabricated steel staircase should be used.

10.5 Work at Height

- (a) Person to work at height should be medically fit and should have height pass issued by safety section. (Appendix-D Part A, B and C). Safety training should be imparted before working at height.
- (b) Safety work-permit system for working at height should be obtained from industrial safety section.
- (c) At elevated places, secure access and foothold should be provided. Adequate and safe means of access and exit should be provided at all work places for all elevations. Means of access may be portable or fixed ladder, ramp or a stairway. The use of crosses, braces or framework, as a means of access to the working platform should not be permitted.
- (d) Linear movement at height should be reduced to minimum. In case of such movement provision for anchoring the safety belt should be made.
- (e) Where barricades cannot be installed, a safety net of adequate strength should be installed close to the level at which there is a danger of fall of personnel/fall of objects.
- (f) In case where 'work at height' is on asbestos roof, crawling board/ roof ladder should be used to walk across the asbestos roof.

10.6 Electrical Safety

- (a) All electrical installations shall comply with the appropriate statutory requirements given below and shall be subject to approval of the Electrical Engineer and Safety Officer.
 - (i) The Electricity Act, 2003
 - (ii) The Indian Electricity Rules 1956 (as amended in 2000)
 - (iii) The National Electricity Code 2008
 - (iv) Atomic Energy (Factories) Rules, 1996
 - (v) Other relevant rules of Statutory Bodies and power supply authority
 - (vi) Relevant standards of BIS

In addition to the above statutory provisions, the clauses indicated in this document shall also be complied.
- (b) It shall be the responsibility of the user seeking temporary power supply to indicate in writing, if any of the clauses (requirements

noted in above regulations and in this document) are conflicting with each other and for which the user cannot decide the course of action regarding safe installation, commissioning, operation, maintenance and decommissioning of the electrical installations.

- (c) The electrical engineer and safety officer of the agency providing temporary power supply shall interpret the concerned conflicting clauses and approve in writing the safe course of action.
- (d) The application Form-1 (Form-1A, 1B and 1C) as mentioned in Appendix-E should be submitted by the user for getting the temporary power supply.
- (e) After installation of temporary electrical panels, wiring works by the user, Certificates as per Form-1D (Appendix-E) should be submitted to the provider.
- (f) Certificate of safety officer and authorization of electrical engineer for energisation of temporary power supply should be filled as per Form-1E (Appendix-E).

10.7 Material Handling and Lifting Machines and Tackles

- (a) It should be made compulsory to supervise jobs like lifting/placing/loading/unloading/carrying/transporting etc. of heavy material by qualified supervisor having knowledge about hazards involved and precautions to be taken for such job.
- (b) The line managers should ensure that the material handling equipment used is adequate to handle the load.
- (c) Manual pulling of heavy equipment and trolley loaded with heavy material is not to be permitted.
- (d) Stacking and handling of heavy materials should be done on a firm ground to prevent settlement.
- (e) No lifting machine and no chain, rope or lifting tackle, except a fiber rope or fiber rope sling, shall be taken into use for the first time in that factory unless it has been tested and all parts have been thoroughly examined by a competent person. A certificate of such a test and examination specifying the safe working load or loads and signed by the person making the test and the examination has been obtained and is kept available for inspection.
- (f) Use of lifting machines and tackles should conform to relevant BIS requirements [IS 13367 (Part 1): 1992 Reaffirmed 2003, IS 4573: 1982 (Reaffirmed 2000) and IS 13834 (Part 1): 1994 Reaffirmed 2003 etc. The accessories and the attachments, anchorages and

supports etc. should be ensured in healthy conditions by regular inspections at defined frequencies.

- (g) Every rope used in hoisting or lowering materials or as a means of suspension should be of good quality and adequate strength and free from any defect. This should be ensured by regular inspection as per IS 2762: 1982- Specification for wire rope slings and sling legs (first revision).
- (h) Every crane operator or lifting appliance operator should be authorized. No person under the age of 18 years should be in charge of any hoisting machine or give signal to an operator of such machine.
- (i) In case of every lifting machine (and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or as a means of suspension) the safe working load should be ascertained and clearly marked. In case of a lifting machine having a variable safe working load, each safe working load and the conditions under which it is applicable should be clearly indicated. No part of any machine should be loaded beyond the safe working load except for the purpose of testing. This should be approved by the engineer-in-charge and Head, Industrial Safety.
- (j) In case of facilities machines, the safety of the machines shall be ensured by the Engineer-in-charge. As regards the Contractor's machines, the contractor should declare the safety of the machine to the Engineer-in-charge whenever he brings any machinery to site of work and get it verified by the engineer-in-charge, supported by a valid test certificate by the competent person.
- (k) Thorough inspection and load testing of lifting machines and tackles should be done in the presence of competent person at least once in every 12 months and records of such inspections and testing should be maintained.
- (l) No mobile crane should be allowed to move under live high-tension power transmission line.
- (m) While lifting loads, cranes should be located on level ground.
- (n) A thorough load analysis should be carried out before using cranes in tandem.
- (o) Motors, gear transmission, couplings, belts, chain drives and other moving parts of hoisting appliances should be provided with adequate safeguards. Hoisting appliances should be provided with such means, which will reduce the risk of any part of a suspended load becoming accidentally displaced or lowered.

- (p) It should be ensured that the cabin of the lifting machine in outdoor service:
 - (i) is made of fire resistant material,
 - (ii) has a suitable seat, a footrest and protection from vibration,
 - (iii) affords the operator an adequate view of the area of operation,
 - (iv) affords the operator adequate protection against the weather, and
 - (v) is provided with fire extinguisher.

10.8 Welding and Gas Cutting

- (a) Welding and gas cutting operations should be done by qualified and authorized persons only.
- (b) Safety work permit shall be obtained (wherever necessary like presence of flammable or combustible material etc.) before flame cutting/welding is taken up.
- (c) Welding and gas cutting should not be carried out in places where flammable or combustible materials are kept and where there is danger of explosion due to presence of gaseous mixtures. In case the requirement cannot be avoided, specific approval and procedure should be ensured and adequate precautions should be taken.
- (d) Welding and gas cutting equipment including hoses and cables should be maintained in good condition.
- (e) Barriers should be erected to protect other persons from harmful rays from the work. When welding or gas cutting is done in elevated positions, precautions should be taken to prevent sparks or hot metal falling below on persons or combustible materials.
- (f) Suitable type of protective clothing consisting of fire resistant gauntlet gloves, leggings, boots and aprons should be provided to workers as protection from heat and hot metal splashes. Face shields with filter glasses of appropriate shade should be worn.
- (g) Adequate ventilation should be provided while welding, brazing and cutting the metals like zinc, brass, bronze, galvanised or lead coated material.
- (h) Welding and gas cutting on drums, barrels, tanks or other containers should be taken up only after ascertaining that they have been emptied, cleaned thoroughly and made free of flammable material.
- (i) Fire safety measures should be available as required near the location of welding/cutting operations.

- (j) Flash back arrestor should be provided with gas cutting and gas welding sets.
- (k) For electric (Arc) welding the following additional safety precautions should be taken:
 - (i) When electrical welding is undertaken the return lead of welding machine should be directly connected to the job invariably.
 - (ii) Provision must be in place in electric welding machine to prevent physical contact with live parts.
 - (iii) The welding cables and power cables should be routed separately to avoid entanglement.
 - (iv) The electric welding set should have suitable earth connections. There should be an electrical isolation device in the input power supply side on the welding machine.
- (l) Double gauges should be used for all gas cylinders used for cutting/welding. Pressure gauges/regulators should be in healthy condition.

10.9 Rotary Cutters/Grinders

- (a) All portable cutter/grinders should be provided with the wheel guard in position.
- (b) Grinding wheels of specified diameter only should be used on all grinders in order to limit the prescribed peripheral speed.
- (c) In pedestal grinder, the gap between tool rest and grinding wheel should be maintained less than 3 mm.
- (d) Goggle/face shield should be used during grinding operation.
- (e) No grinding wheel should be used after its expiry date.
- (f) Ear muff/ear plug should be used during the welding /cutting jobs.
- (g) Portable appliances, which are powered by single phase AC supply, shall be provided with three-core cable and three pin plug, otherwise the whole body should be double insulated.
- (h) Safety work permit should be obtained (wherever necessary like presence of flammable or combustible material etc.) before grinding is taken up.
- (i) Fire safety measures should be available as required near the location of grinding operations.

10.10 Concrete Mixing Equipment

- (a) Cement bags should be stacked on wooden planks in dry and leak proof area, 150 mm to 200 mm from the floor and 450 mm away from walls. Height of the stack should not be more than 15 bags or 1.5 meters whichever is lower. Width of the stack should not be more than 4 bags or 3 meters. Lateral loading of the walls of the storage room by stacking should not be permitted. Stacking of the bags should not be used as a working platform.
- (b) Shuttering and supporting structures should be of adequate strength and approved by engineer-in-charge. This should be ensured before concrete is poured.
- (c) If the mixer has a charging skip the operator should ensure that the workmen are out of danger before the skip is lowered.
- (d) Adequate walking platforms are to be provided in the reinforcement area to ensure safe walking for pouring concrete on the roof.
- (e) When workmen are working/cleaning the inside of the drum of mixer, the power of the mixer should be switched off and 'Do not operate' tag should be provided. The plant operation and cleaning of mixing pan should be carried out as per equipment supplier's instructions.
- (f) Interlocks between the cover and the mixer rotor shall be established to ensure that the agitator does not start when the cover is in open condition.
- (g) It should be ensured that moving parts of the elevators, hoists, screens, bunkers, chutes and grouting equipment used for concrete work and of other equipment used for storing and transporting of ingredients of concrete are securely fenced to avoid contact of workers with such moving parts.
- (h) It should be ensured that screw conveyors used for cement, lime and other dusty material are completely enclosed.
- (i) Workers engaged for handling bulk cement in a confined place should be provided with tight fitting goggles, approved respirators and protective clothing, which will fit snugly around the neck, wrist and ankles.
- (j) The following should be ensured for every pipe carrying pumped concrete:
 - (i) The scaffolding carrying a pipe for pumped concrete should be strong enough to support such pipe at a time when such pipe is filled with concrete or water or any other liquid and to bear safely all the building workers who may be on such scaffold at such time.

- (ii) Securely anchored at its end point and each curve on it.
 - (iii) Provided with an air release valve near the top of such pipe; and securely attached to a pump nozzle by a bolted collar or other adequate means.
- (k) The following should be ensured while using the electric vibrators in concreting work at a construction site of a building or other construction work such that:
 - (i) Such vibrators are earthed.
 - (ii) The leads of such vibrators are heavily insulated.
 - (iii) The current is switched off when such vibrators are not in use.

10.11 Painting

- (a) Appropriate breathing air respirators should be provided for use by the workers when paint is applied in the form of spray, or a surface having lead paint is dry rubbed or scraped.
- (b) Only the quantity of paint, thinner and polish required for the day's work should be kept at the work spot. Excess storage should not be permitted at the work spot.
- (c) Smoking, open flames or sources of ignition should not be allowed in places where paints, varnish, thinner and other flammable substances are stored, mixed or used. A caution board, with the instructions written in national language and regional language, 'SMOKING - STRICTLY PROHIBITED' should be displayed in the vicinity where painting is in progress or where paints are stored. Symbols should also be used on caution boards.
- (d) All electrical equipment of paint storage room should be of explosion proof design. Suitable fire extinguishers / sand buckets should be kept available at places where flammable paints are stored, handled or used.
- (e) When painting work/hot resin mix is done in a closed room or in a confined space, adequate ventilation should be provided and ensured. In addition, suitable respirators should be provided. No portable electric light or any other electric appliance of voltage exceeding 24 volts should be permitted for use inside any confined space. Walkie-talkie or other means of communication should be provided. Rescue arrangement like full body harness with lifeline, tripod with pulley and extra BA sets should be available.

- (f) The workers should use PVC gloves and/or suitable barrier creams to prevent the skin contact with Epoxy resins and their formulations used for painting.

10.12 Demolition

- (a) Before any demolition work is commenced and also during the progress of the work, all roads and open area adjacent to the work site should either be closed or suitably cordoned. Appropriate warning signs should be displayed for cautioning approaching persons/ vehicles.
- (b) Before demolition operations begin, it should be ensured that all the service lines are de-energized.
- (c) Persons handling demolition operations shall use appropriate PPE.
- (d) All demolition operations should be carried out with safe and duly approved procedures which shall include following but not limited to:
 - (i) No masonry/material should be permitted to fall in such masses or volume or weight so as to endanger the structural stability of any floor or structural support.
 - (ii) No wall, chimney or other structure or part of a structure is left unguarded in such a condition that it may fall, collapse or weaken due to wind pressure or vibration.
 - (iii) No floor roof or other part of the building should be overloaded with debris or materials as to render it unsafe.
- (e) After the demolition, the debris and other materials collected should be disposed safely and not permitted to be dropped freely.
- (f) Entries to the demolition area shall be restricted to authorized persons wearing safety helmets and safety shoes.

10.13 Traffic

- (a) All the vehicles moving at sites should conform and comply with the requirements of Motor Vehicles Act, 1988 and the Rules made thereunder. All the drivers /operators of vehicles should possess valid driving license as per Motor Vehicles Act, 1988 or its latest amendment.
- (b) When the construction work causes interference with traffic such as road cutting or transit unloading of heavy equipment etc. notice of such interference should be given to the engineer-in-charge and Head, industrial safety well in advance with the details of start of the work and time required.

- (c) A cleaner/assistant must be available for all heavy vehicles whenever vehicles move forward as well as in the reverse direction. All vehicles should be fitted with proper reverse horns, back view mirrors and indicator signals.
- (d) Facility shall ensure that the assessment of the driver's visual ability is carried out as per Rule 55 of the Atomic Energy (Factories) Rules, 1996/guidelines of advisory committee on occupational health (ACOH), AERB or as per the latest amendments in statutes.
- (e) Effective speed breakers with yellow stripes on the roads to regulate the speed at the vulnerable points should be installed. Effective barricading with adequate caution signs should be placed to warn the vehicle drivers whenever the jobs are carried out on the road.
- (f) All vehicles moving at the site should have roadworthiness certificate issued by the concerned authority.
- (g) Special limit boards and caution boards indicating turns should be installed wherever necessary.
- (h) In general, the following maximum speed limits should be specified and implemented. Vehicles speed limits should be as per Motor Vehicle Act or 20 Km/h. Extra precautions and care should be exercised particularly during heavy material/equipment movements.
- (i) Safety awareness programmes should be conducted for all the drivers of the light, medium and heavy vehicles.

10.14 Work in Radiation Area

The facility shall follow the stipulations under Atomic Energy (Radiation Protection) Rules, 2004 and AERB Safety Manual on 'Radiation Protection for Nuclear Facilities'[AERB/NF/SM/O-2 (Rev.4)] with regard to work in the radiation area and other works related with radiography, etc.

10.15 Work in and Around Water Bodies

- (a) When work is done at a place where there is risk of drowning, all necessary rescue equipment such as life buoys and life jackets should be provided and kept ready for use.
- (b) All necessary steps shall be taken for prompt rescue of any person in danger and adequate provision should be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work. Proper record of entry/exit to and from water bodies shall be maintained on shift basis and search operation shall be conducted as soon as any person is detected to be missing.

- (c) Caisson Work
 - (i) Safe means of access should be provided to the place of work in the caisson and adequate means should be provided to safely reach the top of caisson in the event of inrush of water.
 - (ii) The work relating to construction, positioning, modification or dismantling of caisson shall be done under the supervision of a responsible person.

10.16 Fire Safety

- (a) Provisions prescribed in the AERB safety standard on 'Fire Protection Systems for Nuclear Facilities', [AERB/NF/SS/FPS (Rev. 1)] shall be complied.
- (b) All necessary precautions should be taken to prevent outbreak of fires at the construction site. It should be ensured that all hot works are carried out under valid work permit.
- (c) Combustible materials such as wood, cotton waste, oil, coal, paints, chemicals etc., should be segregated and kept to the required bare minimum quantity at work place.
- (d) Containers of paints, thinners and allied materials should be stored in a separate room which should be well ventilated and free from excessive heat, sparks, flame or direct rays of the sun. The containers of paint should be kept covered or properly fitted with lid and should not be kept open except while using.
- (e) Adequate number of trained persons from approved fire training centre required to extend fire safety coverage should be ensured.
- (f) Fire extinguishers as approved by the engineer-in-charge/in-charge of fire station/safety in-charge should be located at the construction site at appropriate places.
- (g) Adequate number of trained workmen in fire fighting who can operate fire extinguishers should be ensured.
- (h) Portable fire extinguishers with periodic inspection, maintenance and re-filling complying with the mandatory requirements should be ensured.
- (i) Availability of adequate water for fire fighting should be ensured.
- (j) Implementation of the provisions of various statutory licenses for storing gas cylinders, petroleum products, explosives etc. as per the relevant Acts and Rules should be ensured wherever required.

10.17 Environmental Safety

Relevant provisions of the state/central statutory authority regarding environment protection should be adhered to.

10.18 Public Protection

The Contractor should make necessary provisions to protect the public. He should be bound to bear the expenses in defense of every action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of any precaution required to be taken to protect the public. He should pay for the any such damage and cost which may be awarded in any such suit, action or proceedings to any such person, or the amount, which may be fixed as a compromise by any such person.

10.19 Safety of Visitors

- (a) Visitors for the project shall be given health and safety induction before they are allowed in to the construction project. It shall include the minimum PPE to be used, hazards and risks at the work area, restricted areas of entry, emergency response arrangements, etc.
- (b) Visitors shall always be accompanied by one of the employees of the project site.
- (c) Visitors shall not be allowed in the hazardous areas unless they are competent and trained to work in such areas.

10.20 Housekeeping

- (a) It should be recognized that a proper place for everything and everything in its place is maintained for a good housekeeping.
- (b) The material required for immediate use only should be brought to the designated workplace and stacked properly and labeled suitably.
- (c) All work spots, site office and surroundings should all times be kept clean and free from debris, scrap, concrete muck, surplus materials and unwanted tools and equipment. A day-to-day collection and disposal of scraps/debris should be done safely at designated place.
- (d) Electrical cables should be so routed as to allow safe traffic by all concerned. Cable should be preferably supported on the brackets fixed along the wall to maintain safe access. Wherever routing on the floor cannot be avoided, care should be taken to ensure mechanical protection of these cables and safe access is not disturbed.
- (e) No material at any work place should be so stacked or placed or disposed off as to cause danger, inconvenience or damage to any person or environment.

- (f) All unused scaffoldings, surplus/scrap materials and equipment/ systems like temporary electrical panels etc. should not be allowed to accumulate and shall be removed from the premises at the earliest.
- (g) Accumulation of water /oil spillages on the floor or any other workplace should be avoided.
- (h) Proper aisle space marking should be provided in all workplaces.

10.21 Other Statutory Provisions

Notwithstanding the clauses in the above subsections, there is nothing in these clauses to exempt the contractor from the provisions of any other Act or Rules in force in the Republic of India. In particular, all operations involving the transport, handling, storage and use of explosives should be as per the standing instructions and conform to the Indian Explosives Act, 1884 and the Explosives Rules, 1983. Handling, transport, storage and use of compressed gas cylinders and pressure vessels should conform to the Gas Cylinder Rules 2004 and Static and Mobile Pressure Vessels (Unfired) Rules 1981. In addition, The Indian Electricity Act 2003 and Indian Electricity Rules 2005, the Atomic Energy Act, 1962, the Radiation Protection Rules, 2004, the Atomic Energy (Factories) Rules, 1996 and AERB safety manual on 'Radiation Protection for Nuclear Facilities' [AERB/NF/SM/O-2 (Rev.4)] should be complied with.

11. PERSONAL PROTECTIVE EQUIPMENT

11.1 General

Although the primary approach in any safety effort is that the hazard to the workmen should be eliminated or controlled by engineering methods rather than protecting the workman through use of personal protective equipment (PPE). Engineering methods could include design change, substitution, ventilation, mechanical handling, atomization etc. Under those situations when it is not possible to introduce any effective engineering methods for controlling hazards, it is necessary that workman use appropriate type of PPE. For example, in construction work there is the possibility of a hand tool, a bolt, or some loose material to fall from an elevated level and striking the head of workman working below. It is therefore necessary that construction worker wear a safety helmet. It is for such situations, both the Factories Act 1948 and the Atomic Energy (Factories) Rules, 1996 have provisions for use of appropriate type of PPE.

It is thus recognized that use of PPE is an important and necessary consideration in the development of a safety programme. Once the safety professional decides that PPE is to be used by workmen, it is essential to select right type of PPE and construction agency should ensure that workman uses it and also PPE is correctly maintained.

11.2 Personal Protective Equipment (PPE)

- (a) All personal protective equipment as considered necessary should be made available for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also adequate steps should be taken by line manager to ensure proper use of PPE.
- (b) All the PPEs in use should be as per relevant IS standards as referred in the AERB safety guidelines on 'Personal Protective Equipment' (AERB/SG/IS-3).
- (c) All persons employed at the construction site should use safety helmets. Safety helmet should be with BIS mark and should have its headband with back support and chin strap.
- (d) Workers employed on mixing asphaltic materials, cement and lime mortars should use protective goggles, protective foot wears, hand gloves and respirators as required.
- (e) Persons engaged in welding and gas-cutting works should use suitable welding face shields. The persons who assist the welders should use suitable goggles. Protective goggles should be worn while chipping and grinding.

- (f) Stonebreakers should use protective goggles. They should be seated at sufficiently safe distances from one another.
- (g) Safety goggles should be of shatterproof type and with zero power.
- (h) Persons engaged in or assisting in shot blasting operations and cleaning the blasting chamber should use suitable gauntlets, overalls, shatterproof and dust-proof goggles and self contained breathing apparatus set.
- (i) All persons working at heights more than 3.5 m above ground or floor and exposed to risk of falling down should use full body harness safety belts, unless otherwise protected by cages, guard railings, etc. In places where the use of safety belts is not feasible, suitable net of adequate strength fastened to substantial supports should be used.
- (j) When workers are employed in sewers and inside manholes that are in use, it should be ensured that the manholes are opened and are adequately ventilated at least for an hour. After it has been well ventilated, the atmosphere inside the space should be checked for the presence of any toxic gas or oxygen deficiency by a competent person and recorded in the register before the workers are allowed to get into the manholes. A pilot team should enter the area donning self contained breathing apparatus (SCBA). The manholes opened should be cordoned off with suitable railing and provided with warning signals or caution boards to prevent accidents. There should be proper illumination in the night. Depending upon the work situation, the contractor should provide PPE including the SCBA as recommended by Head, industrial safety.

12. MEDICAL MANAGEMENT

12.1 General

- (a) The contractor shall make arrangements for the first aid and medical services for the injured or ill persons for prompt attention or aid.
- (b) The arrangement can be made by the contractor or an agreement can be in vogue with the facility.
- (c) The medical facilities at first-aid centre shall be adequate to immediately cater to the injured based on the hazard potential and probable severe injuries.
- (d) The first-aid centre shall be provided with the adequate equipment and medicines for catering to the site requirements. The first-aid centre shall be manned depending on the working hours / on round the clock shift basis. The services of at least one qualified medical practitioner (medical officer) shall be made available by the contractor.

12.2 Medical Facilities

- (a) Medical facilities conforming to the provisions of the Atomic Energy (Factories) Rules, 1996 should be provided at all work sites.
- (b) The requisite medical facilities in the form of a well-equipped first aid centre manned by qualified nursing personnel should be provided at all work sites. Contractor may avail this facility as per terms and conditions of the contract.
- (c) In addition, well-maintained first-aid boxes should be kept at each location of the work by the contractor and availability of the personnel trained in first aid should be ensured.
- (d) A manned and equipped ambulance should be available at work site during the working hours/on round-the-clock shift basis.
- (e) It should be ensured by the facility that occupational health monitoring of contract workers is carried out as per provisions of the Factories Act 1948 as per the latest amendment and the stipulations/directives given by Atomic Energy Regulatory Board from time to time.
- (f) Display of emergency contact numbers of important persons and hospitals and route map of site shall be maintained at designated places.

12.3 Medical Management of Serious Injuries

- (a) In case of serious injuries, the injured should be shifted to the nearest first-aid centre at site immediately. The opinion of medical officer/certifying surgeon should be sought immediately for medical management.
- (b) After providing the first aid treatment the injured should be shifted to designated medical facility of the site/hospital for further medical assistance, in an ambulance along with a nursing attendant.
- (c) The doctor at the medical facility of the site/hospital attending the case shall assess the extent of injuries and render immediate medical aid. If the situation warrants trauma/special care the injured shall be shifted to the referral hospital, having all the requisite facilities for specialized treatment in ambulance along with a medical attendant.
- (d) A list of such referral hospitals for specialised medical management facilities for the injured persons should be available with the project management/Head, industrial safety and Head, medical services of the site for ready reference.

APPENDIX-D

APPLICATION FOR HEIGHT PASS

PART- A

Group/Section: _____

Agency: _____

1. Applicant's name : _____
2. Facility address : _____
3. Residential address : _____
4. Age : _____
5. Sex : _____
6. Height : _____
7. Gate Pass No. : _____
8. Name of contractor/agency with whom engaged at present : _____
9. Height pass required for work at _____ m. Height
10. Description of present job : _____
11. Previous experience of working at height : _____

S.No.	Name of the employer	Duration of employment	Work experience
1.			
2.			

12. Does the applicant suffer from any of the following ailments ?
(If yes details to be given):
- (a) Blood pressure _____ (b) Epilepsy _____
- (c) Flat foot _____
- (d) Frequent headache or reeling sensation _____
- (e) Mental depression _____ (f) Limping gait _____
- (g) Aerophobia _____

Declaration:

I hereby declare that the above information furnished by me is true and correct. I shall always wear the safety belt and tie the life-line whenever working at unguarded heights of 3 m and above. I shall not misuse the height pass issued to me or transfer it to any other person. I shall never come to duty or work at height/depth under the influence of alcohol/drugs.

Date:

Name:

Sign:

(Applicants Name and Signature or loss time injury (L.T.I) in case he cannot sign. In case of LTI an authorised person shall explain each point/item to the individual and certify on that behalf below the LTI)

I certify that I am satisfied with the above certification of the individual for the application of height pass and request for issue of height pass to him.

Name :

Sign:

(Agency Concerned)

Countersigned by:

Section Head (Facility)

PART-B

MEDICAL FITNESS CERTIFICATE

Certified that I, Dr. _____ have examined Shri. _____
_____ aged _____ on (date) _____ who has signed below in
my presence. General and physical examinations of Shri. _____
do not reveal any abnormality. He does not suffer from any acute/chronic skin disease
or any contagious or infectious disease. His eye sight is normal with/without glasses.
In my opinion, Shri. _____ is physically and mentally fit for
working at height.

Details of examinations are given below:

Personal attributes:

1. Height : _____
2. Chest : _____
3. Weight : _____
4. Hearing : _____
5. Sight : _____
6. Skin : _____
7. Heart beating: _____

Medical aspects:

1. Urine : _____
2. Blood pressure : _____
3. Epilepsy : _____
4. Flat foot : _____
5. Frequent headache
or reeling sensation: _____
6. Mental depression: _____
7. Limping gait : _____
8. Aerophobia : _____

Name:

Signature of workman

Signature and Rubber Stamp of
Medical Practitioner with
Reg. No.

PART-C

INDUSTRIAL SAFETY SECTION

(Considering the above medical certificate, the applicant has appeared on the following practical tests conducted by industrial safety section and the results are given below (strike off whichever is in-applicable)

- (a) Wearing a safety belt and tying the rope knot : Pass/fail
- (b) Walking over a horizontal structure at 3 m. : Pass/fail
height wearing a safety belt
- (c) General physique (OK/Not OK)

The above applicant's performance in the above tests has been satisfactory/unsatisfactory due to the following.

So I certify and issue this height pass to Shri. _____
with Registration No. _____ in the height pass register. This is valid for one
year from the date of issue i.e. up to

Date:

Name:

Signature

Scientific Assistant (Safety)

Safety Officer

APPENDIX-E

FORM - 1

APPLICATION FOR TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION [Prescribed under clause 10.6(d)]

1.	Name and address of user.	
2.	Reference of tender or work order (if applicable)	:
3.	Name and designation of tender/work order issuing authority.	:
4.	Power supply application number [†]	:
5.	Name and designation of tender/work order/work supervising authority (engineer-in-charge).	:
6.	Expected date of commencement of temporary supply	:
7.	Expected date of decommissioning of temporary supply	:
8.	Voltage level (LV/MV/HV)	
9.	Type of connection (1Ph/3Ph)	
10.	Connected load (Kw)	
11.	Maximum demand(KVA)/Power factor	
12.	Single line diagram* of proposed power distribution scheme along with equipment data sheet (downstream installation after point of connection).	Enclosed (Form-1A)/Not enclosed
13.	Name of overall supervisor and available qualified Staff	Enclosed (Form-1B)/Not enclosed
14.	Auxiliary equipment data sheet (meters, fire extinguisher, first aid box etc)	Enclosed (Form-1C)/Not enclosed
15.	Name and designation of provider's representative to whom the application is addressed.	:
16.	Name and designation of authorised signatory of user, who had submitted this application	:

[†] Power supply application number shall be different for same user with multiple applications for temporary supply

* All the drawings and tables shall be signed by user's representative indicated against 16 above.

Signature of authorised signatory of user

Signed endorsement of work order
supervising authority indicated
against 5 above.

FORM - 1A

**EQUIPMENT DATA SHEET FOR OBTAINING TEMPORARY POWER
SUPPLY AND USE OF ELECTRICITY AT WORK SITE DURING
CONSTRUCTION**

(Prescribed against item-12 of form-1)

Name and address of user:

Power supply application

Number:

Amendment No:

References:- Single line diagram (SLD) of the power distribution scheme with all equipment details (attach the SLD)

1. Identity	2. Type	3. Make and model	4. Manufacturer's S.No	5. Fixed/ Portable	6. Size	7. Last used date	8. Last test date	9. Latest test data	10. Rating

Signature of authorised signatory of user

Explanation of column headers:

1. Identity:- Identification mark/number/tag of equipment in single line drawing and layout drawing. Every equipment in single line drawing and layout drawing shall have suitable identification mark/number/tag.
2. Type:- Cable/CB/MCB/MCCB/ELCB/transformer/lightning arrestor/earthing station/earthing connection/motor/lighting fixture/switch/fuse/switch, socket box etc.
3. Make and model:- manufacturer's name and corresponding model no.
4. Manufacturer's S. No:- serial number and date in name plate if available. Else NA
5. Fixed/portable:- Equipment is installed/laid/anchored to surface or portable.
6. Size:- depending upon type of equipment and as desired by provider representative e.g. length for cables or all dimensions if heavy equipment like transformer.
7. Last used date. date of last use else NEW
8. Last test date. latest test date by user or by manufacturer if NEW
9. Latest test data:- IR, HV, resistance, functional test data depending upon the type of equipment as desired by provider's representative.
10. Rating:- name plate rating of equipment like voltage, current, power (apparent, active, reactive), IP of enclosure, size (cable cross section) etc. depending upon the type of equipment and as desired by provider's representative.

FORM - 1B**STAFF DATA SHEET FOR OBTAINING TEMPORARY POWER SUPPLY
AND USE OF ELECTRICITY AT WORK SITE DURING CONSTRUCTION
(Prescribed against item-13 of form-1)**

Name and address of user:

Power supply application**Number:****Amendment No:-**

1. Name	2. Address	3. Tel.No.	4. Responsibility	5. Certification detail	6. Resuscitation training	7. Expe- rience	8. Other relevant training	9. Signature

Signature of authorised signatory of user

Explanation of column headers:

1. Name:- Name of agency/person
2. Address:-
3. Tel No:- regular, alternate and emergency telephone numbers
4. Responsibility:- whether responsible for installation, operation, maintenance, overall supervision etc. overall supervisor shall be indicated specifically.
5. Certification detail:- (a) type of certification e.g wire man license, electrical supervisor license, electrical contractor license, diploma in electrical engineering, degree in electrical engineering etc. (b) certifying agency e.g. state PWD, central PWD, CEA, name of college/university etc. (c) certificate/license number with date. (d) valid up to date or next renewal date must for contractor/supervisor license.
6. Artificial resuscitation training:- indicate YES/NO if the staff is trained to apply artificial resuscitation technique.
7. Experience:- number of years of experience.
8. Other relevant training :- any other training in electrical/ safety course. Indicate name of training, duration (days/months), training providing agency.
9. Signature:- original signature of individual.

FORM - 1C

**AUXILIARY EQUIPMENT DATA SHEET FOR OBTAINING
TEMPORARY POWER SUPPLY AND USE OF ELECTRICITY
AT WORK SITE DURING CONSTRUCTION
(Prescribed against item-14 of form-1)**

Name and address of user:

Power supply application**Number:****Amendment No:-****Reference:- Layout drawing No. / _____**

1. Identity	2. Type	3. Make and model	4. Manufacturer's S. No	5. Fixed/ Portable	6. Size	7. Last used date

Signature of user's representative

Explanation of column headers:

1. Identity:- identification mark/number/tag of equipment in layout drawing.
2. Type:- earthing rod/megger/multi meter/earth resistance meter/fire extinguisher/s and bucket/first aid box/resuscitation chart/rubber mat etc.
3. Make and model:- manufacturer's name and corresponding model no.
4. Manufacturer's S. No:- serial number and date in name plate if available. Else NA
5. Fixed/portable:- equipment is installed/laid/anchored to surface or portable.
6. Size:- depending upon type of equipment and as desired by provider representative.
7. Last used date. NEW for new equipment. NA for passive devices like chart/mat etc.

FORM -1D

(Prescribed under clause 4.6(e)]

Name of user agency

Power supply application number:-

CERTIFICATE BY THE LICENSED ELECTRICAL CONTRACTOR

Certified that subject installations have been carried out by us or checked by us and is in accordance with I.E. Rules. The documents submitted with subject temporary power supply application (Form-1) is verified by us and the complete installation confirms to these documents.

We shall periodically inspect/check the installation so that no unsafe situation arises during use of this temporary power supply system. We understand that for the entire duration of existence of this temporary power supply system we shall be responsible for any unsafe installation, operation, maintenance, testing of the same which results into any loss of life or material. We shall immediately report to the provider's representative and ensure de-energisation of supply if any unsafe situation arises during use of this temporary power supply system.

Signature of the authorised signatory of licensed electrical contractor

Rubber seal of licensed electrical contractor

Date

CERTIFICATE BY THE USER

Certified that my/our installations have been carried out in accordance with the I.E. Rules and that I/We have employed competent agency/staff to handle the installations which is strictly as per the staff data sheet submitted in Form-1B.

We understand that for the entire duration of existence of this temporary power supply system we shall be responsible for any unsafe installation, operation, maintenance, testing of the same which results into any loss of life or material. We shall immediately report to the provider's representative and ensure de-energisation of supply if any unsafe situation arises during use of this temporary power supply system.

Signature of the authorised signatory of user

Name of signatory

Date

FORM -1E

[Prescribed under clause 10.6(f)]

CERTIFICATE BY THE SAFETY OFFICER

Certified that I have inspected the electrical installation referred here in after satisfying myself about the safe condition of the installation, I hereby recommend that the service connection be given to the contractor.

Signature of the safety officer

Name:

Date:

AUTHORISATION BY THE ELECTRICAL ENGINEER

The subject power supply application along with completed installation, necessary certificates (as per Form-1 of Appendix-E) is scrutinised by us. The proposal found to be in order and the installation can be energised on _____ in presence of your designated overall supervisor as indicated in Form-1B. Enclosed herewith the test report data sheet Form-1F. You are requested to carry out the periodic testing of equipment and submit the test report periodically as per this form.

Signature of the electrical engineer
of provider

Name of signatory

Date

FORM - 1F

**TEST/MAINTENANCE REPORT DATA SHEET OF EQUIPMENTS OF
TEMPORARY POWER SUPPLY SYSTEM AT WORK SITE DURING
CONSTRUCTION
(Prescribed against form-1E)**

Name and address of user:

Power supply application**Number:****Amendment No:-**

1. Identity	2. Type	3. Last tested date	4. Next due date of any test	5 Frequency of IR test	6 Frequency of HV test	7. Frequency of earth resistance test	8. Other tests

Signature of electrical engineer of provider

Explanation of column headers:

1. Identity:- Identification mark/number/tag of equipment in single line drawing and layout drawing. Every equipment in single line drawing and layout drawing shall have suitable identification mark/number/tag.
2. Type:- Cable/CB/MCB/MCCB/ELCB/transformer/lightning arrestor/earthing station/earthing connection/motor/lighting fixture/switch/fuse/switch, socket box etc.
3. Last test date: - latest test date indicated in Form-1A.
4. Next due date of any test:- as worked out by frequency of tests indicated in subsequent columns.
5. Frequency of IR test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
6. Frequency of HV test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
7. Frequency of earth resistance test:- required frequency depending upon type of equipment and location of installation. NA if not required after installation.
8. Other tests:- name and description of any other essential tests/maintenance activity and required frequency depending upon type of equipment and location of installation. NA if not required after installation.

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LIST OF PARTICIPANTS

EXPERT COMMITTEE FOR REVIEW OF ‘GUIDELINES’ ON CONTROL OF WORKS

Dates of meeting:	July 9, 2007	July 23, 2007
	September 3, 2007	October 3, 2007
	October 17, 2007	February 22, 2008
	April 4, 2008	April 23, 2008
	May 6, 2008	May 13, 2008
	June 18 & 19, 2008	August 4, 2008
	May 12, 2010	

Members of Sub Committee:

Shri P.B. Kulkarni (Chairman)	:	BARC (Former)
Shri Sushil Kumar	:	DGFASLI
Shri D.K. Jain	:	NPCIL
Shri N. Nagaich	:	NPCIL
Shri P. Lahiri	:	BARC
Shri N. Prasad	:	NPCIL
Shri K. Ramprasad	:	AERB
Shri A.K. Tandle	:	BARC
Shri T.V. Sudhikumaran	:	NPCIL
Shri S.R. Bhave (Member Secretary)	:	AERB

Invitees:

Dr. P.K. Sinha	:	NPCIL (Former)
Shri D. Das	:	AERB

Contributors:

Shri R. Bhattacharya	:	AERB
Shri.S. Sounderarajan	:	BARC
Shri.S.R. Bhave	:	AERB
Shri S. Chockalingam	:	AERB

ADVISORY COMMITTEE ON INDUSTRIAL AND FIRE SAFETY (ACIFS)

Dates of meeting : July 6, 2009
August 4, 2009
November 30, 2009
February 22, 2010
March 26, 2010
April 29, 2010
July 30, 2010
September 21, 2010

Member ACIFS:

Shri S.K. Mukherjee (Chairman)	:	HPCL, Mumbai (Former)
Shri R.K. Gupta	:	HPCL, Mumbai
Shri M.P. Mahajan	:	HWB (Former)
Shri H.S. Ahluwalia	:	NFC (Former)
Shri S.K. Ghosh	:	BARC
Shri S.E. Kannan	:	AERB (Former)
Shri N.K. Agarwal	:	NPCIL (Former)
Shri P.K. Ghosh	:	AERB (Former)
Shri R. Bhattacharya	:	AERB
Shri K. Ramprasad (Member-Secretary)	:	AERB

**PROVISIONAL LIST OF REGULATORY DOCUMENTS ON
INDUSTRIAL AND FIRE SAFETY**

Reference No.	Title	Year of Publication
AERB/NF/FPS (Rev. 1)	Fire Protection Systems for Nuclear Facilities	2010
AERB/NRF/SG/ IS-1 (Rev. 1)	Control of Works	2012
AERB/SG/IS-2	Preparation of Safety Report of Industrial Plants other than Nuclear Power Plants in the Department of Atomic Energy	2001
AERB/SG/IS-3	Personal Protective Equipment	004
AERB/SG/IS-4	Guidelines for Pre-employment Medical Examination and fitness for Special Assignment	2005
AERB/SG/EP-3	Preparation of Site Emergency Preparedness Plans for Non-nuclear Installations.	2000
AERB/SG/EP-4	Preparation of Off-site Emergency Preparedness Plans for Non-nuclear Installations.	2000
AERB/SG/D-4	Fire Protection in Pressurised Heavy Water Reactor Based Nuclear Power Plants	1999
AERB/SM/IS-1	Manual on Database Management for Accidents/ Diseases Happening due to Occupation and Implementation of the same in the Department of Atomic Energy	1991

AERB SAFETY GUIDELINES NO. AERB/NRF/SG/IS-1 (Rev. 1)

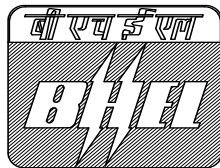
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BCS

BHARAT HEAVY ELECTRICALS LTD

STANDARD SPECIFICATION FOR GEOTECHNICAL INVESTIGATION

SPECIFICATION NO. PE-TS-999-603-002



JUNE, 2009

**POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI BUILDING, PLOT NO. 25
SECTOR-16A
NOIDA (U.P.)-201301**



**STANDARD SPECIFICATION
FOR
GEOTECHNICAL INVESTIGATION**

SPEC. NO. PE-TS 999-603-002

VOLUME II

SECTION D

REV. NO. 0 DATE 11.06.2009

SHEET 1 OF 50

**STANDARD SPECIFICATION
FOR
GEOTECHNICAL INVESTIGATION**

1.0 GENERAL

- 1.1 This specification covers the technical requirements for a detailed “geotechnical investigation and submission of a detailed geotechnical report”. The detailed geotechnical investigation shall be carried out onshore to provide the designer with sufficiently accurate information both general and specific about the sub-strata profile and relevant soil and rock parameters at site on the basis of which the foundation for various structures and equipments of the power station can be designed rationally. Such structures would include main power house, chimney, boiler foundation, turbo-generator foundation, foundation for vibratory equipments, deep pits, reservoir, ash pond, pipe supports and all other related structures of the power station etc. The above list is indicative and not exhaustive. The range of load intensities from the various structures are expected to be between 50 kN/sqm and 500 kN/sqm.

2.0 SCOPE

- 2.1 The work shall include mobilization of all necessary equipments, providing necessary engineering supervision and technical personnel, skilled and unskilled labours, arranging water for drilling etc as required to carry out the entire field as well as laboratory investigation, analysis and interpretation of test data collected and preparation of a geotechnical report. The entire field as well as laboratory investigation work shall be supervised by a graduate/post graduate in civil engineering with atleast 5 years of site experience in respective areas of geotechnical investigation work. A geologist shall also be deputed at site during investigation whenever rock drilling is undertaken. The scheduling of laboratory tests, analysis and interpretation of test results, drafting of report and recommendations shall be carried out by a post graduate in geotechnical engineering with atleast 5 years of experience.



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- 2.2 The contractor shall make his own arrangements for locating the co-ordinates and position of bore holes, trial pits and other field tests as per the drawings/sketches supplied to him and for determining the reduced levels at these locations with respect to a single bench mark indicated by the engineer-in-charge. Two established reference lines will be indicated to him. The contractor has to provide at the site all the required survey instruments to the satisfaction of the engineer-in-charge so that the work can be carried out accurately according to the specification and drawings.
- 2.3 All the field data shall be recorded in the proforma recommended in Indian Standard Codes and the field records shall be countersigned by the engineer-in-charge. The contractor shall submit two copies of the field borelogs to the engineer-in-charge soon after the completion of each bore hole. All the investigations are to be carried out by the contractor as per the priority requirements of the engineer-in-charge.
- 2.4 The contractor shall intimate the engineer-in-charge giving reasons if any additional specific tests he consider necessary to be carried out duly considering local sub-soil conditions. In case the proposal for conducting additional specific tests is approved by the engineer-in-charge then same shall also be carried out.
- 2.5 Whenever the contractor is unable to extract undisturbed samples he should immediately inform the engineer-in-charge. In such a case payment for boring charges shall be subject to the engineer-in-charge being satisfied that adequate effort has been made to extract undisturbed samples.
- 2.6 All the laboratory test data shall be recorded in the proforma recommended in the Indian Standard Codes and a copy of these shall be sent to the engineer-in-charge every week during the progress of laboratory testing. Whenever desired during the progress of work the owner/engineer-in-charge may be present at the laboratory where the contractor is arranging for execution of the laboratory tests.
- 2.7 The contractor shall interact with the engineer-in-charge to get acquainted with the different type of structures envisaged and in assessing the load intensities on the foundation for the various structures of the power project in order to enable him/her to make



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specific recommendation for the depth & type of foundation and the allowable bearing pressure. The contractor shall submit detailed geotechnical report after incorporating the comments (if any) on the draft report.

- 2.8 The “Standard Specification for Geotechnical Investigation” shall be read in conjunction with the document titled “Schedule of Quantities for Geotechnical Investigation” and amendments (if any) which shall be furnished specific project wise separately.

3.0 TENDER DRAWING

- 3.1 A tender drawing titled “Vicinity Map” or “Plot Plan” or “Geotechnical Investigation Layout” indicating the study area/tentative location of the bore holes and field tests/areas to be investigated for locating the project shall be furnished specific project wise separately. The location, extent and depth of bore holes and field tests/area(s) indicated in the drawing are subject to change that may be necessary during actual execution of the work. No claim whatsoever shall be entertained for differences between the location, extent and depth/area(s) etc of tests indicated on the construction drawings and those shown on the tender drawings. The work shall be carried out as per the instructions of the engineer-in-charge.

- 3.2 The bidder must visit the site prior to submitting his/her quotations to acquaint himself/herself fully with the nature, type, scope of work and involvement therein. The rates quoted shall remain firm during the entire period of execution till completion of the work and any additional claim for lack of knowledge shall not be entertained.

4.0 GENERAL REQUIREMENTS

- 4.1 In areas which have already been developed, the contractor shall take advantage of existing local knowledge, record of trial pits, bore holes etc in the vicinity and the type of foundations adopted and behaviour of existing structures particularly those of similar nature to the ones proposed for this project.
- 4.2 The contractor shall make use of information gathered from quarries, unlined wells, cuttings from nearby areas etc. The general



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topography of the near by areas will often give some indication about the variation of the soil conditions which are likely to exist.

4.3 The contractor shall gather data regarding the removal of overburden by excavation, erosion or land slides in the areas which may give an idea of the amount of reconsolidation that the soil strata has undergone. Similarly data regarding recent fills shall also be studied to determine the characteristics of the fill as well as the original strata.

4.4 The water level in streams and water courses if any in the neighbourhood shall be noted. Reliable information regarding ground water level shall also be gathered from water level in the near by wells.

4.5 The contractor shall make enquiries and verify regarding earlier use of the site which can have important bearing on its suitability for the proposed structures. This is important particularly in areas where there have been underground works e.g. worked out ballast pits, quarries, old brick fields, mines, mineral workings etc. The possibility of damage to the structures, sewers, conduits and drainage system by subsidence shall also be investigated.

4.6 It is essential that the equipments/instruments are properly calibrated at the commencement of the work so that they represent true values and submit the test reports to the engineer-in-charge. If the engineer-in-charge so desires, the contractor shall arrange for having the instruments tested in presence of the engineer at an approved laboratory at the contractor's cost and the test reports shall be submitted to the engineer-in-charge.

4.7 When blasting with explosives is involved, agency/contractor shall arrange statutory clearances and also the portable magazine for storing/carrying the explosives.

5.0 CODES AND STANDARDS

5.1 All standards, specification and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions.



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5.2 In case of conflict between this specification and those (IS codes and standards etc) referred to herein, the former shall prevail.

5.3 All work shall be carried out as per the specification and the following standards and codes.

IS: 1080 Code of practice for design and construction of simple spread foundations

IS: 1498 Classification and identification of soils for general engineering purposes

IS: 1888 Method of load test on soils

IS: 1892 Code of practice for subsurface Investigation for foundation

IS: 1904 Code of practice for design and construction of foundations in soils: General requirements

IS: 2131 Method of standard penetration test for soils

IS: 2132 Code of practice for thin walled tube sampling of soils

IS: 2470 Code of practice for design and construction of septic tanks Part-I

IS: 2720 Method of test for soils (Relevant parts)

IS: 2809 Glossary of terms and symbols relating to soil engineering

IS: 2810 Glossary of terms relating to soil dynamics

IS: 2911 Code of practice for design and construction of pile foundations (Relevant parts)

IS: 2950 Code of practice for design and construction of raft foundation Part- I



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- IS: 3025 Methods of sampling and testing (Physical and chemical) for water used in Industry
- IS: 3043 Code of practice for earthing
- IS: 4078 Code of practice for indexing and storage of drill cores
- IS: 4434 Code of practice for in-situ vane shear test for soils
- IS: 4453 Code of practice for exploration by pits, trenches, drifts and shafts
- IS: 4464 Code of practice for presentation of drilling information and core description in foundation investigation
- IS: 4968 Method for subsurface sounding for soils- Dynamic Part -II method using cone and bentonite slurry
- IS: 4968 Method for subsurface sounding for soils-Static cone Part-III penetration test
- IS: 5249 Method of test for determination of in-situ dynamic properties of soil
- IS: 5313 Guide for core drilling observations
- IS: 5529 Code of practice for in-situ permeability test – Test in Part-I overburden
- IS: 5529 Code of practice for in-situ permeability test - Test in bed Part-II rock
- IS: 6065 Recommendation for the preparation of geological and geotechnical maps for river valley project
- IS: 6403 Code of practice for determination of allowable bearing pressure on shallow foundation
- IS: 6926 Code of practice for diamond core drilling for site investigation of river valley projects



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- IS: 6935 Method of determination of water level in a bore hole
- IS: 6955 Code of practice of subsurface exploration for earth and rockfill dams
- IS: 7422 Symbols and abbreviations for use in geological maps, sections and subsurface exploratory logs (Relevant parts)
- IS: 8009 Code of practice for calculation of settlement of
Part-I foundation subjected to symmetrical vertical loads -
Shallow foundations
- IS: 8009 Code of practice for calculation of settlement of
Part-II foundation subjected to symmetrical vertical loads –
Deep foundations
- IS: 8763 Guide for undisturbed sampling of sands
- IS: 8764 Method for determination of point load strength index of rocks
- IS: 9143 Method for the determination of unconfined compressive strength of rock materials
- IS: 9179 Method for preparation of rock specimen for laboratory testing
- IS: 9198 Compaction rammer for soil testing
- IS: 9214 Determination of modulus of sub-grade reaction in field
- IS: 9259 Specifications for liquid limit apparatus
- IS: 9640 Specifications for split spoon sampler
- IS: 9669 Specifications for CBR mould and its accessories
- IS: 10050 Method for determination of slake durability index of rocks



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IS: 10060 Code of practice for subsurface investigation for power house sites

IS: 10074 Specification for compaction mould assembly for light and heavy compaction

IS: 10108 Code of practice for sampling by thin wall sampler with stationary piston

IS: 10589 Equipment for determination of subsurface sounding of soils

IS: 10837 Specifications of moulds for determination of relative density and its accessories

IS: 11229 Specifications for shear box testing of soils

IS: 11315 Description of discontinuities in rock mass - Core Part-II recovery and rock quality

IS: 12070 Code of practice for design and construction of shallow foundations on rocks

IS:13372 Seismic testing of rock mass – Code of practice (Part I & II)

6.0 FIELD INVESTIGATION - SOIL

6.1 Boring

6.1.1 General Requirements

a) Bore holes shall be drilled at specified locations to obtain information about the sub-soil profile, its nature, strength and to collect soil samples for strata identification and conducting laboratory tests. The minimum diameter of the bore hole shall be 150 mm and boring shall be carried out in accordance with the provisions of IS: 1892 and as per this specification.



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b) All bore holes shall extend up to the depths shown on the construction drawings or as directed by the engineer-in-charge. If the strata with standard penetration test (SPT) 'N' value greater than 100 with characteristics of rock is met with earlier, the bore hole shall be advanced further by chiselling. Chiselling shall be continued for a maximum depth of 20cm or upto 2 hours whichever is earlier. During chiselling rock fragments/rock cores shall be collected. Identification of rock strata shall be on the basis of visual examination of SPT sample and rock fragments. After it is established that rock is met with, the borehole shall be advanced further by drilling in rock as specified in Clause-7.0 and cores shall be collected. When the bore hole is terminated in soil strata, an additional standard penetration test shall be carried out at the termination depth.

c) Casing pipe shall be used in the borehole to support its sides when side fall is suspected to occur inside the borehole. When casing pipe is used, it shall be ensured that its bottom end is at all times 15 cm above the bottom of the bore hole. In case of cohesionless soils the advancement of the casing pipe shall be such that it does not disturb the soil to be tested or sampled. The casing shall be advanced by slowly turning the casing pipe and not by driving.

d) In-situ tests and collection of undisturbed samples (UDS) shall be carried out at regular intervals and at change of strata or as decided by the engineer-in-charge. Representative disturbed and undisturbed samples shall be preserved for conducting various tests in the laboratory. Water table in the borehole shall be carefully recorded and reported. No water/drilling mud shall be added while boring above ground water table. For cohesionless soil below water table, the water level in the borehole shall all times be maintained at slightly above the water table.

e) The bore hole shall be cleaned using suitable tools up to the depth of testing or sampling ensuring that there is minimum disturbance of soil at the bottom of the bore hole. The process of jetting through an open tube sampler shall not be permitted. In cohesive soils, the borehole may be cleaned using a bailer with a flap valve. Gentle circulation of drilling fluid shall be done when rotary mud circulation boring is adopted.



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f) On completion of the borehole, the portion drilled in soil shall be backfilled with sand unless otherwise specified and as directed by the engineer-in-charge.

g) Wash boring shall not be adopted.

6.1.2 Auger Boring

Auger boring can be adopted in soft to stiff cohesive soils above water table. Augers shall be of helical or post hole type which may be manually or power operated. While boring care shall be taken to minimise the disturbance to the deposits below the bottom of the borehole. The cuttings brought up by the auger shall be carefully examined in the field and the description of all the strata shall be duly recorded in the field borelog as per IS:1498. No water shall be used while auger boring.

6.1.3 Shell and Auger Boring

Shell and Auger boring can be used in all types of soil free from boulders. For cohesionless soil below ground water table, the water level in the bore hole shall always be maintained at or above the ground water level. The use of chisel bit shall be permitted in hard strata with SPT 'N' value greater than 100. Chisel bits may also be used to extend the borehole through local obstruction such as old construction, boulders, rocky formations etc. All other requirements in clause 6.1.2 shall apply for this type of boring also.

6.1.4 Percussion Drilling

This method can be adopted in soil with gravel and boulders when the boring has to be done at a faster rate. This method consists of breaking of the strata by repeated blows from a chisel or drilling bit and bailing out the debris at intervals by adding water into the bore hole. This method is not suitable for careful and very reliable sampling operation because of the disturbance caused during boring. This method shall not be adopted unless otherwise specified or permitted by the engineer-in-charge.



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6.1.5 Rotary Mud Circulation Drilling

This method can be used in all types of soil below water table. In this method boring shall be done by rotating the bit fixed at the bottom of the drill rod. Proper care shall be taken to keep a firm contact between the bit and the bottom of the borehole. Bentonite or mud laden fluids shall be used as the drilling fluid to serve as the protective surface inside the borehole.

6.2 Standard Penetration Test (SPT)

This test shall be conducted in all types of soil deposits met within the bore hole to find the variation in the soil stratification by correlating with the number of blows required for unit penetration of a standard penetrometer. This test shall be conducted at every 1m interval alternate to collection of UDS upto 10m depth below ground level and at every 1.5m interval alternate to collection of UDS beyond 10m depth, at every change of strata, at depths wherever undisturbed soil samples could not be collected and as per the directions of the engineer-in-charge. The starting depth of performing SPT shall be 1m below ground level unless otherwise specified. The depth interval between the top level of standard penetration test and to that of (next) undisturbed sampling shall not be less than 1m. The specification for equipments and other accessories, procedure for conducting the test, presentation of test results and collection of disturbed soil samples etc shall conform to IS: 2131.

This test shall be carried out by driving a standard split spoon sampler in the borehole by means of a 63.5 kg hammer having a free fall of 0.75m. The sampler shall be driven using the hammer for 450 mm penetration. While driving, the number of blows for every 150 mm penetration and the penetration for every 50 blows shall be recorded. The number of blows for the last 300 mm drive shall be reported as 'N' value. This test shall be discontinued when the blow count is equal to 100 and the penetration shall be recorded. Refusal shall be considered to be met with when the blow count is equal to 100. At the location where the test is discontinued, the penetration and the corresponding number of blows shall be reported. Sufficient quantity of disturbed soil samples shall be collected from the split spoon



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sampler for identification and laboratory testing. The samples shall be visually classified & recorded at the site and shall be properly preserved and labelled for future identification & testing.

6.3 Sampling

6.3.1 General

a) Sufficient number of soil samples shall be collected for reliable estimation of soil properties. The samples collected shall be either disturbed or undisturbed. Disturbed soil samples shall be collected for field identification and conducting laboratory tests such as sieve analysis, index properties, specific gravity, chemical analysis etc. Undisturbed samples shall be collected to estimate physical, strength and settlement properties of the soil.

b) All the accessories required for sampling and the method of sampling shall conform to IS:2132. All disturbed and undisturbed samples collected in the field shall be classified at site as per IS: 1498.

c) All the samples shall be identified with date, bore hole or trial pit number, depth of sampling etc. It is also essential to mark an arrow pointing towards the top surface of the undisturbed sample as the soil was in-situ. Care shall be taken to keep the undisturbed soil samples and box samples vertically with the arrow directing upwards. The tube samples shall be properly trimmed at both ends and suitably sealed with molten paraffin wax at both ends immediately after extracting the samples from the bore hole/trial pit and suitably capped on both sides.

d) When the contractor fails to collect undisturbed soil sample at a specified depth, the borehole shall be advanced by 0.50m and shall be performed with a standard penetration test. The reason for not obtaining the undisturbed soil sample shall be indicated in the borelog.

e) Precaution shall be taken to ensure that there shall not be any change in moisture content and disturbance of the soil samples and they shall be placed in a temporary store at the end of the day's work.



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All the samples shall be kept over a bed of sand, jute bags, saw dust etc and covered over the top with similar material. The bed and top cover shall be kept moist till they are properly packed in wooden boxes. The contractor shall be responsible for packing and transporting of all the samples from site to the laboratory within seven days after sampling with proper protection against loss and damage.

f) All the samples shall be suitably packed in wooden boxes using sand, saw dust etc all around the samples before transporting to the laboratory for testing.

6.3.2 Disturbed Samples

a) Disturbed soil samples shall be collected from cuttings and from split spoon sampler in boreholes at regular intervals to provide complete description of soil profile and its variation. The samples shall be immediately stored in airtight jars or polythene bags and labelled with borehole/trial pit number and depth.

b) In elevated areas, if superficial material is available in plenty, then bulk samples from a depth of about 0.5m below ground level shall be collected to establish all required properties to use it as a fill material. Disturbed samples weighing about 250N shall be collected at shallow depths and immediately stored in polythene bags as per IS: 1892. The bags shall be sealed properly and shall be kept in wooden boxes.

6.3.3 Undisturbed Samples

In each borehole UDS shall be collected at regular interval of 1m alternate to conducting SPT upto 10m depth below ground level and at every 1.5m interval alternate to conducting SPT beyond 10m depth and as directed by the engineer-in-charge. The starting depth of collecting UDS shall be 2m below ground level unless otherwise specified and as directed by the engineer-in-charge. Undisturbed samples shall be of 100mm diameter and 450mm length. Samples shall be collected in such a manner that the structure of soil and its moisture content do not get altered. The specification for the accessories required for sampling and the sampling procedure shall



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conform to IS:1892 and IS:2132. Undisturbed sampling in sand shall be done using compressed air technique as mentioned in IS:8763. Thin walled sampler shall be used to collect undisturbed samples by pushing the tube into the soil. The sampling tube shall have a smooth finish on both surfaces and minimum effective length of 450mm. The area ratio of sampling tubes shall be less than 12.5%. However in case of very stiff soils area ratio upto 20% shall be permitted.

a) Undisturbed Sampling in Cohesive Soil

Undisturbed samples in soft to stiff cohesive soils shall be obtained using a thin walled sampler. In order to reduce wall friction, suitable precautions such as oiling the surfaces shall be taken. The bore hole shall be cleaned and the depth of sampling below ground level shall be noted. The sampler shall then be attached to the bottom of boring rods and lowered into the borehole. The sampler shall be pushed into the clay layer by hand or by jacking and soil sample of specified length shall be collected without disturbing the soil. The distance by which the sampler penetrates into the soil strata shall be checked. Care shall be taken to ensure that the sampler is not driven too far as this will compress the soil. The sampler shall be rotated to break the core at bottom of the sampler and then steadily drawn up.

b) Undisturbed Sampling using Piston Sampler

Undisturbed samples in very loose saturated sandy & silty soils and very soft clays shall be obtained by using a piston sampler consisting of a sampling cylinder and piston system. In soft clays and silty clays with water standing in the casing pipe, piston sampler shall be used to collect undisturbed samples. During this method of sampling expert supervision is called for.

The interior surface of the sampler shall be smooth, clean and corrosion resistant. Its cutting edge and the ring seals shall be inspected for wear and rejected if worn. Check shall be done to ensure that the moving parts of the sampler function freely before the sampler is lowered into the borehole. While pushing the system into the soil and till the beginning of the sampling operations, the bottom of the piston shall be flushed with the cutting edge of the sampler. At the depth of sampling, the piston should be fixed relative to the



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ground and the sampler cylinder shall be independently pressed down smoothly and continuously into the ground. If an obstruction is met, the sampler shall be withdrawn and another sample be taken after the obstruction is removed.

Accurate measurements of the depth of sampling, height of sampler, stroke and length of sample recovery shall be noted and recorded. After the sampler is pushed to the required depth, both the sampler cylinder and the piston system shall be drawn up together ensuring that there shall not be any disturbance to the sample which shall then be protected from changes in moisture content.

c) Undisturbed Sampling in Cohesionless Soils

Undisturbed samples in cohesionless soils shall be obtained as per the procedure given in IS:8763. Compressed air sampler shall be used to take the samples of cohesionless soil below water table. Precautions shall be taken to clean the borehole before sampling. Thin walled tube samplers of 60mm internal diameter shall be used. The height and other dimensions of the sampler shall be recorded before use. Proper care shall be taken to maintain the water level in the bore hole slightly above the ground water table before and during sampling operations. Immediately after the sample is obtained, the ends of the sample shall be waxed and capped to avoid moisture content changes.

6.3.4 Relaxation During Sampling

a) The sampler shall be pushed into the soil and driving of sampler shall be resorted to only when it cannot be pushed into the soil. This shall be done only with the permission of the engineer-in-charge and all the details about the same shall be recorded in the bore logs.

b) In clays when 'N' value is greater than 50, the undisturbed sampling may be replaced by standard penetration test.



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6.4 Ground Water

6.4.1 One of the following methods shall be adopted for determining the ground water table in bore holes as per IS:6935 and as per the instructions of the engineer-in-charge.

a) In permeable soils, the water level in borehole shall be allowed to stabilize after lowering it adequately by bailing. When water level inside the borehole is found to be stable, the depth of water level below ground level shall be measured. Stability of sides and bottom of the borehole shall be ensured at all times.

b) For both permeable and impermeable soils, the following method shall be suitable. The borehole shall be filled with water and then bailed out to various depths. Observation on the rise or fall of water level shall be made at each depth. The level at which neither a fall nor a rise is observed shall be considered as the water table elevation. This shall be established by three successive readings of water level taken at an interval of two hours.

6.4.2 In case any variation in the ground water level is observed in any specific boreholes then the water level in these bore holes shall be recorded daily during the course of field investigation. Levels in nearby wells, streams etc if any shall also be noted whenever these readings are taken. If so called for, observation wells shall be drilled for the purpose of long term studies on the fluctuation in ground water levels and pressure. Either stand pipe or piezometer shall be installed at the specified depths in the selected previously drilled bore holes or specially drilled bore holes for this purpose as per the specification and instructions of the engineer-in-charge. Daily water level readings shall be recorded immediately following the installation upto the time of leaving the site. At the end of field work, these installations shall be handed over in satisfactory working condition to the engineer-in-charge without disturbing their position so that the owner can continue further observations.

6.4.3 Stand pipes and piezometers shall consist of 19mm internal diameter rigid unplasticised (UPVC) tubing. All the joints in the tubing shall be made of coupling sleeves. The top of UPVC tubing shall be enclosed in a 75mm diameter galvanised steel pipe of 1.5m length



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having a galvanised steel screw cap with well greased threads and the caps shall be tightened such that it would be impossible to loosen by hand. The lower end of the pipe shall have four legs of 6mm thick and 100mm long and welded to have projection of 25mm. The pipe shall be sealed into the ground with cement grout so that it does not rotate. The top end of the pipe shall project about 300mm above ground level unless otherwise specified by the engineer-in-charge. The perforated tubing for the porous element shall be surrounded by a response zone of well graded sand from 500mm below to 150mm above the lower end of the stand pipe or piezometer and the bore hole above the response zone shall be back filled with natural soil or well graded sand.

a) Stand pipe

Stand pipes shall be installed to measure the water level in soils with high permeability such as sand and gravel. The stand pipe shall consist of a perforated tubing attached to the bottom of the UPVC tubing. The perforated tube shall be 150mm long having perforations of diameter not greater than 1mm.

b) Piezometers

Piezometers shall be installed to measure the pore pressures in soil with medium to low permeability. Piezometer shall consist of a porous filter attached to the bottom of the UPVC tubing. The filter shall be 300mm in length and shall be placed in the bore hole and sealed at top and bottom by grouting. Hydraulic piezometers with double line are to be used to remove the air trapped in the system.

6.4.4 Sub-Soil Water Samples

a) Sub-soil water samples shall be collected for carrying out chemical analysis. Representative samples of ground water shall be collected when it is first encountered in boreholes before the addition of water to aid boring or drilling. Water samples shall not be collected when bentonite slurry or mud has been used for drilling operations. If water has been added for drilling purposes or if ground water has been diluted by surface rain water then the bore hole shall be



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dewatered and water be allowed to rise from which the sample may be taken.

b) The sampling apparatus shall be such that the water at the desired depth can be collected directly without any disturbance and any change in concentration of constituents like dissolved gases etc. Undue agitation shall be avoided. An ordinary suction pump with its suction end inserted upto the required depth in the borehole shall be used for this purpose.

c) The sample shall be collected in a clean vessel and allowed to settle so that the supernatant liquid can be poured into a clean well rinsed glass or polythene bottle. Sufficient quantity and number of samples shall be collected to carry out the chemical analysis and sent to a laboratory in airtight bottles with proper labelling. Chemical analysis of water samples shall include determination of pH value, turbidity, sulphate, carbonate, nitrate & chloride contents, presence of organic matter and suspended solids etc.

d) In some cases constituents may be mixed and analysed later as specified in the specific test methods. Chemical preservatives may be added to the sample for cases as specified in the test method/IS codes. This shall only be done if analysis cannot be conducted within an hour of collection and shall have the prior written permission and approval of the engineer-in-charge.

6.5 In-situ Permeability Test

6.5.1 In-situ permeability test shall be conducted to determine the water percolation capacity of overburden soil. This test shall be performed inside the bore hole/trial pit at specified depths or in each layer or as per the directions of the engineer-in-charge. The type of test shall be either pump-in or pump-out test depending on the subsoil and ground water conditions. Pump-in test shall be conducted whether ground water in borehole exists or not. Pump-out test shall be conducted to obtain data for dewatering purposes when ground water is met in the borehole. The specification for equipments required for the test and the procedure of testing shall be in accordance with IS: 5529, Part-1. When it is required to carry out the permeability test for a particular section of the soil strata above ground water table, bentonite slurry shall not be used while boring.



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6.5.2 Pump-in-Test

Pump-in test shall be conducted in the bore hole/trial pit by allowing water to percolate into the soil. Choice of the method of testing shall depend on the soil permeability and prevailing ground water level.

Only clear water shall be used for conducting the test. Before conducting the test, the borehole shall be cleaned as specified in clause 6.1.1 (e). Water shall be allowed to percolate through the test section for sufficient period of time to saturate the soil before starting the observation.

a) Constant Head Method (In Bore Hole)

This test shall be conducted in boreholes where soil has a high permeability. Water shall be allowed into the borehole through a metering system ensuring gravity flow at constant head so as to maintain a steady water level in the borehole. A reference mark shall be made at a convenient level which can be easily seen in the casing pipe to note down the fluctuations of water level. The fluctuations shall be counteracted by varying the quantity of water flowing into the borehole. The elevation of water shall be observed at every 5 minute interval. When three consecutive readings show constant value, the necessary observations such as flow rate, elevation of water surface above test depth, diameter of casing pipe etc shall be made and recorded as per the proforma recommended in IS: 5529, Part-1, Appendix-A.

b) Falling Head Method (In Bore Hole)

This method shall be adopted for soils of low permeability and which can stand without casing. The test section shall be sealed at the bottom of the borehole and a packer at the top of the test section. If the test has to be conducted at an intermediate section of a pre-bored hole then double packers shall be used. Access to the test section through the packer shall be by means of a pipe which shall extend above the ground level. Water shall be filled into the pipe upto the level marked just below the top of the pipe and water be allowed to drain into the test section. The water level in the pipe shall be



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recorded at regular intervals as mentioned in IS: 5529, Part-1, Appendix-B. The test shall be repeated till constant records of water level are achieved.

c) Percolation Test (In Trial Pit)

Percolation test shall be conducted in trial pit in areas where water/effluent is stored/discharged in ground level tanks. The loss of water due to percolation into the soil shall be estimated by the soil absorption capacity.

6.5.3 Pump-Out Test

This test shall be carried out at site to determine the co-efficient of permeability of soil below water table. This test shall be conducted by continuous pumping out of water from a well so as to maintain a steady water level at the desired depth in the well. The fluctuations in the water level shall be counteracted by varying the quantity of water pumped out of the well. The specification for the equipments & accessories required for performing the test, the procedure of testing, field observations and reporting of results shall conform to IS: 5529, Part-1. The well shall be of 400mm in diameter to be installed with a 250mm diameter perforated GI/MS pipe. Observation pipes of 50mm diameter shall be installed at regular intervals along three radial lines extending from the well at 120 degrees to each other. Length of these pipes shall depend upon the ground level, estimated depth of lowering the ground water and the distance from the well. Sufficient number of observation pipes shall be installed along each of the radial lines so as to assess the zones of influence due to dewatering. Draw down depth in the well shall be as specified in the drawing.

6.6 TRIAL PIT

- 6.6.1 Trial pits shall be of 3m x 3m size so as to permit easy access for visual examination of walls of the pit and to facilitate sampling and in-situ testing operations. Pits shall be excavated upto a maximum depth of 4m below ground level or as per the directions of the engineer-in-charge. Precautions shall be taken to ensure the stability of pit walls including provision of shoring if necessary as per IS:



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4453. Precautions shall be taken to prevent surface water draining into the pit. Arrangements shall be made for dewatering if the pit is extended below water table. Trial pits shall be kept dry and a ladder shall be provided for easy access to the bottom of the pit. In-situ tests shall be conducted and undisturbed samples shall be collected immediately on reaching the specified depth so as to avoid substantial changes in moisture content of the subsoil. Arrangements shall be made for barriers, protective measures and lighting necessary for the period the pits remain open.

6.6.2 A note on the visual examination of soil strata shall be prepared. This should include the nature, colour, consistency and visual classification of the soil, thickness of soil strata, thickness of expansive soil & ground water table if any etc.

6.6.3 Undisturbed samples shall be collected at 1m, 2m, 3m depth and at the termination depth in all the pits.

a) Chunk Samples

In cohesive soils, undisturbed samples of regular shapes shall be collected. The samples shall be cut and trimmed to a size of 0.3m x 0.3m x 0.3m. A square area of 0.35m x 0.35m shall be marked at the centre of the levelled surface at the bottom of the pit. Without disturbing the soil inside the marked area, the soil around this marking shall be carefully removed upto a depth of 0.35m. The four vertical faces of the soil block protruding at the centre shall be trimmed slowly so that its size reduces to 0.3m x 0.3m. Wax paper cut to suitable size shall be wrapped uniformly and covered with two layers of thin cloth over all the five exposed surfaces of the soil block and sealed properly using molten wax. A firmly constructed wooden box of size 0.35m x 0.35m x 0.35m (internal dimensions) with the top and bottom open shall be placed around the soil block and held such that its top edge protrudes just above the surface of the block. The space between the soil block and the box shall be filled uniformly and tightly with moist saw dust. The top surface shall also be covered with saw dust before nailing the wooden lid to cover the box firmly taking care that the soil block is not disturbed. The area of contact between the bottom portion of the block and the ground shall be reduced slowly by removing soil in small quantities using



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small rods so that the block can be separated from the ground slowly without disturbance. After inverting the wooden box along with the soil block, the bottom portion shall be trimmed and covered with wax paper, cloth and to be sealed with molten wax. A wooden lid shall be nailed to the box after providing proper saw dust cushion below it. An arrow mark shall be made on the vertical face of the wooden box to indicate the top surface of the sample along with the location, date and depth of sampling.

b) Tube Samples

Undisturbed tube samples may also be obtained by means of 100mm diameter sampling tubes with a cutting edge. The sampler shall be slightly oiled or greased inside and outside to reduce friction. The sampler shall be pushed into the soil and while doing so soil around the tube shall be carefully removed. In case it is not possible to push the sampler it may be driven by light blows from a "monkey".

6.6.4 In case it is not possible to collect undisturbed samples in the pit, in-situ density of soil shall be determined by sand replacement method. The specification, equipments, accessories etc required for the test and the procedure of testing shall be in accordance with IS: 2720, Part-XXVIII. No separate payment shall be made for this test.

6.6.5 After the completion of the test, sampling and visual examination, the pit shall be suitably backfilled as directed by the engineer-in-charge. Unless otherwise specified excavated soil shall be used for this purpose.

6.7 Vane Shear Test

Field vane shear test shall be performed inside the borehole to determine the shear strength of cohesive soils, especially of soft and sensitive clays which are highly susceptible to sampling disturbance. This test shall be conducted by advancing a four winged vane of suitable size (75mm or 100mm diameter as per the soil condition) into the soil upto desired depth and measuring the torque required to rotate the vane. The specification for equipments & accessories required, the test procedure and field observations etc shall be as per IS: 4434. This test may also be conducted by direct penetration from



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the ground surface. If the cuttings at the test depth in the bore hole show any presence of gravel, sand, shells, decomposed wood etc which are likely to influence the test results substantially, the test at that particular depth may be omitted with the permission of the engineer-in-charge. However the test shall be conducted at a depth where these obstructions cease to occur. On completion of the test the results shall be reported in an approved proforma as specified in IS: 4434, Appendix-A.

6.8 Static Cone Penetration Test

Static cone penetration test shall be conducted to know the soil stratification and to estimate the various physical and engineering properties of soil. The cone penetrometer shall be advanced by pushing and the static force required for unit penetration shall be determined. The test shall be conducted using a 200kN capacity mechanically operated equipment upto the specified depth or refusal whichever is earlier. For this test, 'refusal' means meeting a very hard strata which cannot be penetrated at the rate of at least 0.3cm/sec even when the equipment is loaded to its full capacity. The specification for the equipment and accessories required for performing the test, test procedure, field observation and reporting of results shall conform to IS : 4968, Part-III. At the ground level, preboring upto 0.5m depth shall be permitted if the overlying strata is very hard. No extra payment shall be made on account of this preboring. Continuous record of the penetration resistance shall be maintained.

6.9 Dynamic Cone Penetration Test

Dynamic cone penetration test shall be conducted using bentonite slurry by driving a standard size cone attached to the bottom of a string of drill rods. The test shall be conducted upto the specified depth or refusal whichever is earlier. Refusal shall be considered when the blow count exceeds 150 for 300mm penetration. The specification for the equipment and accessories required for performing the test, test procedure, field observations and reporting of results shall conform to IS:4968, Part-II. The driving system shall comprise of a 65 kg weight having a free fall of 0.75m. The cone



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shall be of 65mm diameter provided with vents for continuous flow of bentonite slurry through the cone and rods in order to avoid friction between the rods and soil. On completion of the test, the results shall be presented as a continuous record of number of blows required for every 300mm penetration of the cone into the soil in a suitable chart supplemented by a graphical plot.

6.10 Plate Load Test

- 6.10.1 Plate load test shall be conducted to determine the bearing capacity and load/settlement characteristics of soil at shallow depth by loading a plane and levelled steel plate kept at the desired depth and measuring the settlement under different loads until a desired settlement takes place or failure occurs. The specification for equipment and accessories required for conducting the test, the test procedure, field observations and reporting of results etc shall conform to IS: 1888. The location and depth of the test shall be as given in the drawing or as indicated by the engineer-in-charge. Undisturbed tube samples as specified in clause 6.6.3 (b) shall be collected at 1m and 2.5m depths from the ground level for carrying out laboratory tests.
- 6.10.2 The size of pit shall not be less than five times the plate size and the depth shall be as specified. All provisions regarding excavation and visual examination of pit under clause 6.6.1 and 6.6.2 shall apply here also.
- 6.10.3 If the ground water table is at a depth higher than the specified test depth, the ground water table shall be lowered and maintained at the test depth for the entire duration of the test. Dewatering shall be at the cost of the contractor.
- 6.10.4 Unless otherwise specified the reaction method of loading shall be adopted. Settlement shall be recorded from dial gauges placed at four diametrically opposite ends of the test plate. The test plate shall be of 600mm x 600mm size and atleast 25mm thick. The bottom of the pit shall be levelled before placing the plate in position for conducting the test.



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- 6.10.5 A seating load of 7kN/sqm shall be applied and after the dial gauge readings are stabilized, the load shall be released and the initial readings of the dial gauges be recorded after they indicate constant reading. The load shall be increased in stages. These stages shall be 20, 40, 70, 100, 150, 200, 250, 300, 400, 500, 600 and 800kN per sqm or as directed by the engineer-in-charge. Under each loading stage, record of 'time vs settlement' shall be kept as specified in IS:1888.
- 6.10.6 In case of cohesive soils, each load increment shall be maintained until the settlement is less than 0.02mm/minute or 6 hours whichever is later. Dial gauge readings for settlement shall generally be taken at 1, 2.25, 4, 6.25, 9, 16, 25, 60, 90 and 120 minutes from the start of each stage of loading. Thereafter the readings shall be taken at hourly interval upto a further 4 hours and at two hours interval thereafter for another 6 hours.
- 6.10.7 Other than cohesive soils (for all other type of soils), each stage loading shall be maintained for a minimum duration of one hour or till the settlement rate reduces to 0.02mm/minute whichever is later. No extrapolation of settlement rate from periods less than one hour shall be permitted. The final loading shall be maintained for 24 hours. During unloading, reading of dial gauge shall be recorded for each stage of unloading.
- 6.10.8 Loading shall be carried out in stages as specified above till one of the following conditions occur.
- a) Failure of soil under the plate i.e. the settlement of the plate at constant load becomes progressive and reaches a value of 40 mm or more.
- b) Load intensity of 800 kN/sqm is reached without failure of the soil.
- 6.10.9 Backfilling of the pit shall be carried out as per the directions of the engineer-in-charge. Unless otherwise specified the excavated soil shall be used for this purpose.



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6.11 Cyclic Plate Load Test

This test shall be carried out to determine the dynamic soil properties required for the analysis of foundation subjected to dynamic loads. This test shall be conducted on similar lines as the ordinary plate load test with an addition that unloading shall also be done before each stage of loading. Test set up, load increment and maximum load intensity etc shall be as per Clause- 6.10.

- 6.11.1 After each stage of loading, the load shall be removed in a minimum of two stages and as directed by the engineer-in-charge. After each stage of reduction of load, dial gauge readings and settlements shall be taken for atleast one hour until the readings stabilize. Thereafter the next loading stage shall commence. Recording and analysis of test data shall be as per IS: 5249.

6.12 Field California Bearing Ratio Test

This test shall be carried out to obtain the properties of soil required for the design of roads. The equipments and accessories required for carrying out the test, test procedure, recording of observations and presentation of results shall conform to IS: 2720 part XXXI. The test locations and depth shall be as specified in the drawings or as directed by the engineer-in-charge.

6.13 Electrical Resistivity Test

This test shall be conducted to determine the electrical resistivity of soil required for designing safety grounding system for the entire power plant area. The specification for the equipments and other accessories required for performing the test, test procedure and reporting of field observations shall conform to IS:3043. The test shall be conducted using Wenner's four electrode method as specified in IS:1892, Appendix-B2. Unless otherwise specified, at each test location the test shall be conducted along two perpendicular lines parallel to the co-ordinate axes. On each line, the spacing of electrodes shall be kept at 1m, 2m, 5m and 10m. Testing shall be done during the driest season prevalent in the area to the extent possible. In no circumstances shall the testing be done during or



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immediately after the rainy season or persistent rains or in the vicinity of any existing water body such as ponds, streams etc.

6.14 Seismic Refraction Test

6.14.1 This test shall be carried out to establish the rock and soil profiles of varying density. The dynamic shear modulus of the soil shall also be obtained from the results of this test. The specification for the equipments and other accessories, procedure for carrying out the test, recording and analysis of results and their presentation shall conform to IS: 1892.

6.14.2 This test shall be carried out by inducing shock waves into the soil by striking a plate placed on the ground surface with a hammer. The shock waves shall be picked up through geophones placed on the ground surface at regular intervals in line with the plate along a straight line. The time elapsed before the waves reach the geophones shall be recorded to an accuracy of one millisecond or better.

6.14.3 The distance between the shock point and the geophones shall be increased to cover a wider area. Alternatively, multiple geophones shall be used simultaneously using multiple channel seismograph to record the arrival time and intensity of waves reaching the geophones. The spacing of geophones shall be 5m. As the distance between geophones and the shock producing point are increased, the time lapse for the waves passing through different underlying strata and reaching the geophone shall be recorded. The wave forms shall be recorded for each test using multiple channel seismograph.

6.14.4 The test shall be conducted along traverses in two orthogonal directions as specified in the drawing or as directed by the engineer-in-charge. During testing, proper care shall be taken to avoid disturbance caused due to the movement of vehicles or other working operations around the test location. The type of wave (compression or shear) shall be analysed properly using the data recorded during the test.



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6.15 Cross Hole Shear Test

This test shall be generally carried out in accordance with IS: 13372 to establish the dynamic elastic properties of soil and rock. In this test, the seismic waves are to be picked up in two adjacent receiver boreholes. The spacing of boreholes shall be determined so as to obtain good results. The boreholes shall be uncased in the portion carrying the geophones. However it should be kept filled with water or drilling mud in order to ensure perfect contact between the borehole wall and the geophone. In case of cased hole preferably a low velocity material such as a high impact PVC should be used for casing and it is essential that it should be well grouted behind in order to make an intimate contact with the soil. The charge shall be installed within the depth as specified and the waves shall be picked up from the geophones installed at required depths in receiver boreholes. Knowing the travel time from shot hole to receiver hole and corresponding distance, the velocity of the waves is determined which enables to estimate dynamic elastic modulus, shear modulus and Poisson's ratio. In each receiver borehole multiple geophones shall be provided at 2m interval (with starting depth as 3m below ground level) to cover the depth and various strata as specified. Intensity of the waves shall be recorded by multiple channel seismograph.

6.16 Pressuremeter Test

6.16.1 This test shall be conducted in bore holes at desired depth to obtain the in-situ stress-strain characteristics and strength parameters of soil/rock layer by measuring the deformation of the probe at different pressures of the volumeter. The location and depth of the test shall be as given in the drawing or as per the directions of the engineer-in-charge.

6.16.2 All precautions shall be taken to ensure a smooth bore hole of required diameter with minimum disturbance to the surrounding soil. In soft, loose and sensitive soils, the bore hole shall be predrilled deeper than the testing depth for enough so that the cuttings settling at the bottom of the bore hole shall not interfere with the test.



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- 6.16.3 The equipment shall be calibrated for pressure losses (membrane correction/air calibration) and volume or radius changes (line calibration/thick wall rigid steel cylinder test) before starting of test and at regular intervals as per the manufacturer's specification.
- 6.16.4 Maximum value of pressure correction shall not be more than 50% of limit pressure. The total volume losses in the system shall not exceed 0.5% of the static probe volume per 100kPa. Volume correction may be neglected in soil if it is less than 0.1% of probe volume per 100 kPa.
- 6.16.5 The test shall be performed by expanding a cylindrical probe to obtain a pressure vs volume or pressure vs radius curve as specified in IS:1892. The probe may be of Ax, Bx or Nx size. However the size of the borehole shall be compatible to the size of pressuremeter probe. Hose pipe connecting the probe with the surface unit shall be of flexible tubing of single or coaxial type. The equipment should be able to reach a maximum pressure of 5000kPa for testing in soil and 8000kPa for testing in rock. The accuracy of measuring device shall be such that a change of 0.2% of static probe volume or 0.1% of probe radius is measurable as specified in IS:1892.
- 6.16.6 The probe shall be lowered down to the required depth as soon as the boring is completed so as to limit the expansion of soil due to release of stresses. The probe shall be held by a clamping device ensuring that it is not located at the interface of two different soil/rock layers.
- 6.16.7 The pressure shall be increased in atleast 20 equal stages as directed by the engineer-in-charge. At each stage the pressure shall be maintained for a period of atleast 60 seconds and volume reading shall be taken for 7 to 14 minutes. The volume of water sent into the probe during this period shall be measured upto an accuracy of 0.01cum. In case the water level in the volumemeter drops rapidly, it is necessary to close the volumemeter valve quickly so that the reservoir does not empty and allow air or gas into the tubing.
- 6.16.8 The test shall be carried out in stages till one of the following conditions occur.



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- a) The volume of the probe is doubled
- b) Ultimate failure of soil/rock occurs
- c) Load intensity of 5000kPa for soil and 8000kPa for rock is reached without failure.

6.16.9 If the shape of uncorrected pressure vs volume curve drastically varies from the ideal test curve, the test shall be repeated at no extra cost to the owner/BHEL at a different depth as decided by the engineer-in-charge.

6.16.9 On completion of the test, all results mentioned in Clause- 9.2 shall be reported.

7.0 FIELD INVESTIGATION - ROCK

7.1 Rock Drilling

Drilling in rock shall be done at specified locations or as per the directions of the engineer-in-charge. Before commencing drilling, it shall be proved that characteristics of rock has been met with as mentioned in clause 6.1.1(b). The starting depth of drilling in rock as mentioned in clause 6.1.1(b) shall be certified by the engineer-in-charge. The portion drilled in rock shall be backfilled with 1part of cement : 3 part of sand (1:3) grout unless otherwise specified and as directed by the engineer-in-charge.

7.1.1 Equipment

a) Core drilling shall be done by rotary motion using diamond bit. The feed or thrust to the drilling bit shall be actuated by hydraulic system. The rotary core drilling equipment and procedure for drilling shall conform to IS: 6926. The equipment shall be provided with necessary facilities to regulate the spindle speed, bit pressure and water pressure during core drilling to get a good core recovery.

b) Drilling shall be carried out with Nx size diamond tipped drill bits or impregnated diamond bits depending on the type of rock encountered. Double tube swivel core barrel of Type B conforming to IS: 6926 shall be used to ensure a good core recovery and to pick



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up cores from all layers of rock. Suitable core catchers shall be used to ensure continuous and good core recovery.

7.1.2 Procedure

a) The drilling fluid shall be clean water. Circulation of drilling fluid shall be started before the core barrel reaches the bottom of the hole to prevent cuttings or sludge from entering the core barrel at the start of coring. Drilling fluid shall be circulated continuously down the hollow rods and the sludge conveying the rock cuttings to the surface shall be collected.

b) When drilling through soft/weathered/fractured rock, water circulation must be reduced so as to avoid shattering/breaking of core.

c) The rotational speed of the bit (spindle speed), the amount of downward pressure applied on the bit (bit pressure) and water pressure shall be suitably adjusted and properly monitored so that the core is collected with least disturbance and to avoid shearing of the core from its base. Bit speed, bit pressure, water pressure for the type of bit for various rock types shall be as per Appendix A of IS:6926.

d) No drill run shall exceed 0.75m in length. This can be increased to 1.5m provided the core recovery observed is more than 80% in two successive 0.75m drill runs and on approval from the engineer-in-charge. If the core recovery is less than 20% then SPT shall be performed before commencing the next drill run as explained in Clause- 6.2.

e) If at any time blocking of the bit or grinding of the core is observed, the core barrel shall be immediately withdrawn from the borehole regardless of the length of drill run completed.

7.1.3 Observations

a) The colour of return water at regular intervals, the depth at which any change of colour of return water is observed, the depth of



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occurrence and amount of flow of hot water if encountered shall be recorded.

b) The depths through which a uniform rate of penetration was maintained, the depth at which a marked change in rate of penetration or sudden fall of drill rod occurs, the depth at which any blockage of drill bit causing core loss if any etc shall be recorded.

c) Any heavy vibration or torque noticed during drilling should be recorded together with the depth of occurrence.

d) Special conditions like the depth at which grouting was done during drilling, presence of artesian conditions, loss of drilling fluid, observation of gas discharge with return water etc shall also be observed and recorded.

e) During drilling operation, observation on return water, rate of penetration etc shall be recorded in a proforma as given in IS: 5313, Appendix-A.

7.1.4 Core Samples

a) Core samples shall be extracted by the application of a continuous pressure at one end of the core with the barrel held horizontally without vibration. Friable cores shall be extracted from the barrel directly into a suitable sized half round plastic channel section. Care shall be taken to maintain the direction of extrusion of sample same as that while coring to avoid stress reversal.

b) Immediately after withdrawal from the core barrel, the cores shall be placed in a tray and transferred into boxes specially prepared for the purpose. The boxes shall be made from seasoned timber or any other durable material and shall be indexed on top of the lid as per IS:4078. The cores shall be numbered serially and arranged in the boxes in a sequential order. The description of the core samples shall be recorded as per IS: 4464. Where no core is recovered, it shall be recorded as specified in the continuous record of core recovery and RQD in the corelog as per IS:11315, Part-II.



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c) The basic information for the description of rocks shall cover
i) degree of weathering ii) discontinuity spacing iii) strength iv)
colour v) grain size vi) structural condition, the mineralogy of the
grains and cementing material vii) rock name, special features like
major joint planes, features/laminations, faults etc.

7.2 Standard Penetration Test

The relevant hardness of rocks shall be tested in boreholes after every drill run of 0.75m in rock if core recovery observed is less than 20% or as directed by the engineer-in-charge. The testing equipment and arrangement shall be conforming to IS: 2131. The number of blows for each 75mm penetration to a total penetration of 450mm shall be recorded. Penetration for every 50 blows shall be recorded and the test shall be stopped at a total of 100 blows.

7.3 Plate Load Test

The test shall be conducted as described under Clause- 6.10 for soil subject to the following changes.

The test plate shall be of size 45cm x 45cm and at least 25mm thick. The maximum load shall be 1500 kN/sqm to be applied in stages of 25, 50, 100, 150, 200, 300, 400, 600, 800, 1000, 1200, 1400 and 1500 kN per sqm. Under each load the time Vs settlement shall be recorded and plotted.

7.4 Pressuremeter Test

This test shall be conducted as described under Clause- 6.16 for soil subject to the following changes. The test shall be carried out till one of the following condition occurs.

- a) The volume of the probe is doubled
- b) Ultimate failure of rock
- c) Load intensity of 8000 kN/sqm is reached without failure.

7.5 Cross Hole Shear Test

This test shall be conducted as described under Clause- 6.15 for soil.



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7.6 Permeability Test

Permeability test shall be conducted in bed rock inside the bore hole by pumping in water under pressure to determine the percolation capacity of the rock strata. This test shall be conducted in uncased and ungrouted sections of the drill hole. Clear and clean water shall be used for the purpose of both drilling and testing. The specification for the equipments and other accessories, test procedure etc shall conform to IS: 5529, Part-II. The length of the test section shall be either 1.5m or 3m as per field conditions and as per the directions of the engineer-in-charge. The level of water table (if any) in the bore hole shall be recorded and the drill hole shall be cleaned before the start of the test. Depending upon the depth of the test section, single or double packer method shall be adopted. Care shall be taken to maintain water tightness of all the joints and connections during testing.

a) Single Packer method

This method shall be adopted when the bottom elevation of the test section is the same as the bottom of the drill hole. The packer shall be fixed at the top level of test section such that only the test section lies below the packer. Water shall then be pumped through a pipe into the test section under a required pressure and maintaining it till a constant quantity of water intake is observed. The amount of water percolating through the hole shall be recorded at every 5 minute interval. The test shall be repeated by increasing the pressure at regular intervals upto a pressure limit as specified in IS: 5529, Part-II. The details and observations shall be recorded in a proforma as recommended in IS: 5529, Part-II, Appendix-B.

b) Double Packer method

This method shall be adopted when the permeability of an isolated section inside a drill hole is to be determined. Packers shall be fixed both at the top and bottom of the test section such that their spacing is exactly equal to the length of the test section. The test shall then be conducted as specified in Clause- 7.6(a).



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8.0 LABORATORY INVESTIGATION

8.1 Essential Requirements

a) All laboratory tests shall be conducted in an approved laboratory using approved apparatus complying with the requirements and specifications of Indian standards or other approved standards for this class of work. It shall be checked that the apparatus are in good working condition before starting the laboratory tests. Calibration of all the instruments and their accessories shall be done carefully and precisely.

b) Depending on the type of sub strata encountered, appropriate laboratory tests shall be conducted on soil and rock samples collected in the field. Laboratory tests shall be scheduled and performed by a qualified and experienced personnel who are thoroughly conversant with the work. Tests indicated in the schedule of items shall be performed on soil, rock and water samples as per relevant IS codes. One copy of all the laboratory test data records shall be submitted to the owner progressively every week. Laboratory tests shall be carried out concurrently with field investigation since initial laboratory test results could be useful in planning the later part of field work. **A schedule of laboratory tests shall be established by the contractor and the same shall be submitted and got approved by the engineer-in-charge before starting of laboratory tests.**

c) All samples whether undisturbed or disturbed shall be extracted, prepared and examined by a competent personnel properly trained and experienced in soil sampling, examination, testing and in using the apparatus as per the specified standards.

d) Undisturbed soil samples retained in liners or seamless tube samplers shall be taken out without causing any disturbance to the samples using suitably designed extruder just prior to actual testing. If the extruder is horizontal, proper support shall be provided to prevent the sample from breaking. For screw type extruders the pushing head shall be free from the screw shaft so that no torque is applied to the soil sample in contact with the pushing head. For soft clay samples, the sample tube shall be cut by means of a high speed



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hacksaw to specified test length and placed over the mould before pushing the sample into it with a suitable piston.

e) While extracting a sample from a liner or tube care shall be taken to see that its direction of movement is the same as that during sampling to avoid stress reversal.

f) On all undisturbed soil samples tested for bulk density, water content, grain size distribution, liquid limit and plastic limit tests shall also be performed.

g) On all rock samples tested for unconfined compression test, bulk density and water content tests shall also be performed.

h) After completion of all tests, a summary of test results for each soil and rock sample shall be presented in a proforma as enclosed in **Annexure-A & B** respectively. Chemical test results on soil and water samples shall be furnished in a tabular form separately.

8.2 Tests

Tests as indicated in this specification and as called for by the engineer-in-charge shall be conducted. The tests shall include the following.

a) Tests on Undisturbed and Disturbed Soil Samples

- Visual and engineering classification
- Sieve analysis and hydrometer analysis
- Liquid, plastic and shrinkage limits
- Specific gravity
- Chemical analysis
- Swell pressure and free swell index determination
- Proctor compaction
- California bearing ratio



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b) Test on Undisturbed Soil Samples

- Bulk density and moisture content
- Relative density (for sand)
- Unconfined compression test
- Box shear test
- Triaxial shear tests (depending on the type of soil and field conditions on undisturbed or remoulded samples)
 - i) Unconsolidated undrained
 - ii) Consolidated undrained test with the measurement of pore water pressure
 - iii) Consolidated drained
- One dimensional consolidation test

c) Test on Rock Samples

- Visual classification
- Water absorption, porosity and density
- Specific gravity
- Hardness
- Slake durability
- Unconfined compression test (both at saturated and at in-situ water content)
- Point load strength index
- Deformability test (both on saturated and dry samples)



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c) Chemical Analysis of Sub-soil and Ground Water

8.3 Salient Test Requirements

a) Remoulded soil specimen whenever desired shall be fully reworked at field density and natural moisture content. For conducting CBR test and triaxial test for dyke/road material the sample shall be remoulded to 95% of standard proctor density.

b) Triaxial shear test shall be conducted on undisturbed soil samples saturated by the application of backpressure. Only if the water table is at sufficient depth such that chances of its rising to the base of the footing are meagre or nil, the triaxial tests shall be performed on the specimens at natural moisture content. Each test shall be carried out on a set of three test specimens from one sample at cell pressures equal to 100, 200 and 300 kN/sqm or as required depending on the soil conditions.

c) Effective stress triaxial shear test shall be consolidated undrained with pore water pressure measurement. The test shall be conducted at cell pressures of 100, 200 and 300 kN/sqm ensuring complete consolidation at each stage.

d) Direct shear test shall be conducted on undisturbed soil samples. The three normal vertical stresses for each test shall be 100, 200 and 300 kN/sqm or as required depending on the soil conditions.

e) Consolidation test shall have loading stages of 10, 25, 50, 75, 100, 200, 400 and 800 kN/sqm. Rebound curve shall be recorded for all the samples by unloading the specimen at the in-situ stress of the specimen. Additional rebound curves shall also be recorded whenever desired by the engineer-in-charge.

f) Chemical analysis of sub-soil shall include determination of pH value, carbonate, sulphate (both SO_3 and SO_4), chloride and nitrate contents, organic matter, salinity and any other chemicals harmful to the foundation material. The contents in soil shall be indicated as percentage.



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g) Chemical analysis of sub-soil water sample shall include the determination of the properties such as colour, odour, turbidity, pH value and chemical contents such as carbonate, sulphate (both SO_3 and SO_4), chloride, nitrate, organic matter and any other chemicals harmful to the foundation material. The contents such as sulphate etc shall be indicated as ppm by weight.

h) The laboratory CBR test shall be performed on undisturbed or on remoulded sample as per the drawing or as directed by the engineer-in-charge in soaked and unsoaked conditions.

9.0 REPORT

9.1 General

a) On completion of all the field and laboratory works, the contractor shall submit a draft report containing geological information of the region, procedure adopted for investigation, field observations, summarised test data, conclusion and recommendations. The report shall include detailed borelogs, sub-soil sections, field test results, laboratory observations and test results in both tabular as well as graphical forms, practical and theoretical considerations for the interpretation of test results, the supporting calculations for the conclusions drawn etc. Initially, the contractor shall submit three copies of the report in draft form for the owner/BHEL's review.

b) After review of the draft report, the employer's comments will be intimated to the contractor. The contractor shall incorporate the comments and after getting the amended draft report approved, five copies of the detailed final report shall be submitted alongwith one set of reproducible of the graphs, tables etc. Any expenditure on account of redrafting, finalising the report etc shall be deemed to have been included in the quoted rates.

c) The detailed final report based on field observations, in-situ and laboratory tests shall encompass theoretical as well as practical considerations for foundation of different type of structures envisaged in the area under investigation. The contractor shall acquaint himself about the type of structures, foundation loads and other information required from the engineer-in-charge.



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9.2 Data to be Furnished

The report shall also include but not be limited to the following.

- a) A Plot Plan/Geotechnical Investigation Layout showing the location and reduced levels of all field tests e.g. bore holes, trial pits, plate load tests etc properly drawn to scale and dimensioned with reference to the established grid lines.
- b) Geological information of the area such as geomorphology, geological structure, lithology, stratigraphy and tectonic faults, seismicity of the region and site, core recovery and rock quality designation etc.
- c) Past observations and historical data if available for the area or for other areas with similar soil profile for similar structures in the surrounding areas.
- d) A true cross section of all individual boreholes and trial pits with reduced levels and co-ordinates showing the classification and thickness of individual stratum, position of ground water table, various in-situ tests conducted and samples collected at different depths and the rock stratum if met with.
- e) A set of longitudinal and transverse soil/rock profiles connecting various bore holes in order to give a clear picture of the variation of the subsoil strata as per IS: 6065.
- f) Water level contours and rock level contours
- g) Plot of standard penetration test 'N' values (both uncorrected and corrected) with depth for identified areas.
- h) Results of all field tests in tabular as well as in graphical forms.
- i) Results of all laboratory tests summarised (i) for each sample as well as (ii) a consolidated table giving the layer-wise soil and rock properties . All the relevant charts, tables, graphs, figures, supporting



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calculations, conclusions and photographs of representative rock cores and trial pits shall be furnished.

j) For all triaxial shear tests, stress vs strain diagrams as well as Mohr's circle envelopes shall be furnished. If back pressure is applied for saturation, the magnitude of the same shall be indicated. The value of modulus of elasticity 'E' shall be furnished for all tests along with relevant calculations.

k) For all consolidation tests the following curves shall be furnished.

e vs log P

e vs P and

Compression vs log t or square root of t (depending upon shape of the plot for proper determination of coefficient of consolidation)

The point showing initial condition (e_0 , P_0) of the soil shall be marked on the curves.

l) Values of compression index, coefficient of volume compressibility etc shall be furnished. The procedure adopted for calculating the compression index from the field curve and settlement of soil strata shall be clearly specified. The time required for 50% and 90% primary consolidation along with secondary settlement if significant shall also be calculated.

m) For pressuremeter tests, the following shall be furnished.

Calibration record including description of membrane and sheath on probes, dimensions of thick walled cylinder, length of flexible tubing, calibration curves and temperature etc.

Drilling record including borehole number, method of making borehole, log with soil type and condition, depth of water table in the borehole, weather and temperature etc.

Test record including type of test, date and time, depth of centre point of probe, volume readings at 30 and 60 second elapsed time and corresponding pressure readings and notes on any deviation from standard test procedure etc.



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Field pressuremeter, creep and air calibration curves indicating P_o , P_f and P_l . Corrected pressuremeter and creep curves indicating P_o , P_f , P_l along with calculation for the corrections.

n) Values of cohesion, angle of internal friction, pressuremeter modulus, shear modulus and co-efficient of sub-grade reaction along with sample calculations. Calculation for allowable bearing pressures and corresponding total settlements for shallow foundations and load carrying capacity calculation of piles in various modes etc.

o) Analysis and discussion of test results.

9.3 Recommendations

Recommendations shall be given areawise duly considering the type of soil/rock, structure, foundation type and ground water table etc in the area. The recommendations shall include but not be limited to the following.

a) Type of foundation to be adopted for various structures duly considering the sub strata characteristics, water table, total settlement permissible for the structures and equipments, minimum depth and width of foundation etc.

b) For shallow foundations the following shall be furnished with comprehensive supporting calculations.

i) Net safe bearing pressure for isolated square/rectangular footings and continuous strip footings of sizes 1, 2, 3, 4 & 5m at different founding depths of 1, 2, 3, 4 & 5m below ground level considering both shear failure and settlement criteria giving reasons for the type of shear failure adopted in the calculation.

ii) Net safe bearing pressure for raft foundation of widths greater than 6m at 2, 3, 4 & 5m below ground level considering both shear failure and settlement criteria.



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iii) Modulus of sub-grade reaction and modulus of elasticity from plate load test results along with time-settlement curves and load-settlement curves in both natural and log-log graph.

c) If piling is envisaged the following shall be furnished with comprehensive supporting calculations.

i) Type of pile and reasons for recommending the same duly considering the sub strata characteristics.

ii) Suitable founding strata for the pile.

iii) Estimated length of pile for 800kN (450mm dia.), 1050kN (500mm dia.), 1500kN (600mm dia.) and 4500kN (1070mm dia.) capacities. End bearing and frictional resistance shall be indicated separately. Safe lateral and tensile load carrying capacities of pile with supporting calculations.

iv) Magnitude of negative skin friction if any.

d) Coefficient of permeability of various sub-soil and rock strata based on in-situ permeability tests.

e) Cone resistance, frictional resistance, total resistance and settlement analysis for different size of foundations.

f) Electrical resistivity of sub-soil based on electrical resistivity tests including electrode spacing vs cumulative resistivity curves.

g) Dynamic soil properties such as dynamic shear modulus and Poisson's ratio etc from cross-hole shear and seismic refraction tests and coefficient of elastic uniform compression from cyclic plate load tests.

h) Suitability of the soil for construction of roads and embankments, their stable slopes for shallow and deep excavations, active and passive earth pressures, earth pressure at rest and modulus of elasticity as a function of depths for the design of underground structures etc.



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i) Suitability of locally available soils at site for filling and back filling purposes.

j) If expansive soil is met with, then recommendation on removal or retainment of the same under the structures/roads etc shall be given. In the latter case, detailed specifications of any special treatment required including specification for materials to be used, construction method, equipments to be deployed etc shall be furnished.

k) Protective measures based on chemical nature of soil and ground water with due regard to the potential deleterious effects on concrete, steel and other building materials etc. Remedial measures for sulphate attack and acidity shall be dealt in detail.

l) Susceptibility of sub soil strata to liquefaction in the event of earthquake. If so, recommendation for remedial measures.

m) Identification of any other potential geotechnical problems and their remedial measures.

n) Description of measures required for erosion control.

o) Identification of corrective measures required for the improvement of sub surface conditions such as removal of poor sub soil/material and in-situ densification etc. If ground improvement is recommended then its detailed specification, specification for the materials to be used, construction method, equipments to be deployed etc shall be furnished.

10.0 RATES & MEASUREMENTS

10.1 RATES

a) The item of work in the schedule of quantities describes the work very briefly. The various items of the schedule of quantities shall be read in conjunction with the corresponding sections in the technical specification including amendments and additions if any. For each item in the schedule of quantities, the bidder's rates shall include all the activities covered in the description of the items as well as for



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all necessary operations in details described in the technical specification.

b) No claims shall be entertained if the details shown on the released for construction drawings differ in any way (e.g. location and depth of tests, number of tests etc) from those shown on the tender drawings.

c) The unit rates quoted shall include minor details which are obviously and fairly intended and which may not have been included in these documents but are essential for the satisfactory completion of the work.

d) The bidders quoted rates shall be inclusive of providing all equipments, men, materials, skilled and unskilled labours, making observations, establishing the ground level and coordinates at location of each bore hole, test pit etc by carrying levels from one established bench mark and distances from one set of grid lines furnished by the engineer-in-charge. Also no extra payments shall be made for conducting the standard penetration tests, collection, packing and transportation of all the samples and cores, recording of all results and submitting them in approved formats etc.

e) The quoted rates for trial pits/plate load tests/ cyclic plate load tests shall be inclusive of dewatering and backfilling etc.

f) The quoted rates for drilling in rock shall satisfy the requirements as furnished in specification.

g) The rates quoted for conducting pump out test shall be inclusive of boring a well of 400mm diameter, providing and installation of perforated GI/MS pipes and observation pipes etc .

h)The rates quoted for conducting cross hole shear test shall be inclusive of necessary boring, providing PVC pipes, grouting, geo-phones, backfilling the holes after completion of testing etc.

i)The rates quoted for laboratory tests shall include preparation of samples, performing tests, recording, analysis and submission of data etc.



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j) The bidder shall submit a scheme showing the arrangement and equipment proposed to be used for conducting the site work along with rates. However the minimum number of staff and equipments to be deployed/mobilised for site works shall be as per **Annexure-C & D** respectively.

10.2 MEASUREMENTS

- a) All measurements shall be in SI Units.
- b) Length shall be measured in metres (m) correct to two places of decimals. Areas shall be worked out in square meters(Sqm) and volume in cubic meters(Cum) rounded off to two decimals.
- c) Certain tests have to be conducted in the bore holes and trial pits etc. Such bore holes and trails pits etc shall be measured once only and not again just because the tests are conducted therein.
- d) The depth of penetration due to SPT at the bottom of bore hole shall not be considered for the measurement of bore hole depth.
- e) Pits shall be measured in Cum.
- f) Coring in rock with diamond bit shall be measured in length(metre) correct to two places of decimal for the actual cored length satisfying the criteria of specification.

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ANNEXURE - A SUMMARY OF LABORATORY TEST RESULTS ON SOIL SAMPLES																													
BORE HOLE/ TRIAL PIT NO.	DEPTH (m)	TYPE OF SAMPLE	DENSITY (kN/Cum)		WATER CONTENT (%)	PARTICLE SIZE (%)				ATTERBERG'S LIMITS				SOIL		STRENGTH TEST		CONSOLIDATION TEST				SWELL TEST		COMPACTION TEST		RELATIVE DENSITY	PERMEABILITY (m/hr)	REMARKS	
			BULK	DRY		GRAVEL	SAND	SILT	CLAY	LL	PL	PI	SL	IS CLASSIFICATION	DESCRIPTION	SPECIFIC GRAVITY	TYPE	C	ϕ	e_o	Pc	Cc	p	m_v	Cv				S.Pr
<u>For type of sample</u> DS Disturbed soil sample UDS Undisturbed soil sample RMS Remoulded soil sample WS Water sample <u>For strength test</u> UCC Unconfined compression test VST Vane shear test Tuu Unconsolidated undrained triaxial test Tcu Consolidated Undrained Triaxial test with pore pressure Tcd Consolidated drained triaxial test (Note: Replace T by D for Direct Shear test)												<u>For others tests</u> LL Liquid Limit (%) PL Plastic Limit (%) PI Plasticity Index (%) SL Shrinkage limit (%) C Cohesion (kN/Sq.m) ϕ Angle of internal friction (degrees) S.Pr Swelling pressure (kN/Sq.m) FSI Free swell index (%) e_o Initial Void ratio Pc Preconsolidation pressure (kN/Sq.m) Cc Compression index												p Pressure range (kN/Sq.m) m_v Coefficient of volume compressibility (Sq.m/kN) Cv Coefficient of consolidation (Sq.m/hr) MDD Maximum Dry Density (kN/Cum) OMC Optimum moisture content (%) CBR California Bearing Ratio (%)					



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ANNEXURE-B

SUMMARY OF LABORATORY TEST RESULTS
ON ROCK CORE SAMPLES

BORE HOLE NO.	
DEPTH	
CORE PIECE NO.	
MOISTURE CONTENT	
SPECIFIC GRAVITY	
HARDNESS	
POROSITY	
DRY DENSITY	
SLAKE DURABILITY	
POINT LOAD STRENGTH INDEX	
DEFORMABILITY (DRY /SATURATED)	
UNCONFINED COMPRESSIVE STRENGTH (INSITU/SATURATED)	
CORE DESCRIPTION	
REMARKS	



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ANNEXURE-C

MINIMUM STAFF TO BE DEPLOYED

<u>S.No.</u>	<u>Description</u>	<u>No. of persons</u>
1.	Geotechnical Engineer	To be filled by respective BHEL Power Sector Region project wise considering the project schedule and actual scope of work
2.	Engineering Geologist	
3.	Supervisor	
4.	Qualified Surveyor	
5.	Rig Operators	
6.	Mechanic	



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ANNEXURE-D

LIST OF EQUIPMENTS TO BE MOBILISED TO SITE (MINIMUM)

<u>S.No.</u>	<u>Description</u>	<u>Quantity</u>
1	Shell and auger boring set	To be filled by respective BHEL Power Sector Region project- wise considering the project schedule and actual scope of work
2.	Rotary core drilling unit (Hydraulic feed)	
3.	Static cone penetration test equipment - 20T capacity	
4.	Dynamic cone penetration test equipment	
5.	Plate load test set up	
6.	Field permeability test set up	
7.	Menard pressuremeter or equivalent set up with limit pressure of 80kg/sq.cm.	
8.	Seismic refraction test set up	
9.	Electrical resistivity test set up	

Note:

Additional equipments shall be mobilized if required as per the directions of the engineer-in-charge to match the work schedule.



- NOTES:—

1	RO	FOR INFORMATION	BY 21/12/2015
ISSUE No.	REV. No.	DESCRIPTION	TCE
			SIGNATURE

DES'D.	CHK'D. <i>[Signature]</i>	REV'D. <i>[Signature]</i>	APP'D. <i>[Signature]</i>
ENGINEERING CONSULTANT			

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

TITLE :- GORAKHPUR HARYANA ANU VIDYUT PARIYOJANA-1&2
MAIN PLANT LAYOUT UNIT 1&2

DES'D.	-	DR'N.	AZM	REV'D.JRM

DATE -	DATE 21/12/2017	DATE 21/12/2017
DES. CHK'D. -	DRG. CHK'D. MK	APP'D. RVI
DATE -	DATE 21/12/2017	DATE 21/12/2017

PROJECT:-	GHAVP-1&2	SCALE - 1:1
		PROJECTION

DRG. No. PF-DG-485-602-C002		PROJECTION	T

Signed by: TESTPLM		FILE NAME: GHAYP12_10000_5001_CA_R0
DRG. TO BE READ IN CONJUNCTION WITH: G040304/0504_15 MAY	2	1

WITH DCN/PLN/ECN, IF ANT.	

Rev 02
08th October
2014

SPECIAL CONDITIONS OF CONTRACT (SCC)

(Document No PS:MSX:SCC)

BHARAT HEAVY ELECTRICALS
LIMITED



SPECIAL CONDITIONS OF CONTRACT (SCC)

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4	Obligations of Contractor (In respect of Tools, Tackles, Consumables, etc employment of supervisory staff and workmen)	Chapter-IV	
5	Responsibilities of Contractor (In respect of employment of Labour, Supervisory staff, etc)	Chapter-V	
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SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - I : General Intent of Specifications

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

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - I : General Intent of Specifications

1.6	Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.
1.7	Following shall be the minimum responsibility of contractor and have to be provided within finally accepted rates / prices:
1.7.1	Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated MMEs (Monitoring and Measuring Equipment) as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling
1.7.2	Achieving Proper out-turn / Turn-over as per BHEL plan and commitment.
1.7.3	Completion of work as per BHEL Schedule
1.7.4	Good quality and accurate workmanship for proper performance of the equipment
1.7.5	Repair and rectification
1.7.6	Preservation / Re-conservation of all components during storage / erection / commissioning till handing over.

SPECIAL CONDITIONS OF CONTRACT (SCC)
Chapter - II : General Services to be rendered by the Bidder

2.0	GENERAL SERVICES TO BE RENDERED BY THE BIDDER
2.1	Services for construction, fabrication, equipment erection testing as well as trial run & commissioning of various equipment and accessories under the contract shall include but not be limited to the following:
2.2	Issuing materials from store/open yard from time to time for erection as per the construction programme. The Contractor shall be the custodian of all the materials issued till the plant/equipment is officially taken over by the owner / BHEL after complete erection any successful trial run & commissioning.
2.3	Transport of material to their respective places of erection and erection of the complete plant & equipment as supplied under this specification.
2.4	Trial run and commissioning of individual equipment / sub-systems to the satisfaction of Owner/BHEL.
2.5	Deployment of all skilled and unskilled manpower required for erection, supervision of erection, watch & ward, commissioning and other services to be rendered under this specification.
2.6	Deployment of all erection tools & tackle, construction machinery, transportation vehicles and all other implements in adequate number and size, appropriate for the erection work to be handled under scope of this specification except otherwise specified.
2.7	Supply of all consumables, eg welding electrodes, cleaning agents, diesel oil, lubricant etc as well as materials required for temporary supports, scaffolding etc as necessary for such erection work, unless specified otherwise.
2.8	Providing support services for the contractor's erection staff eg construction of site offices, temporary stores, residential accommodation and transport to work site for erection personnel, watch and ward for security and safety of the materials under the Contractor's custody etc. as required.
2.9	Maintaining proper documentation of all the site activities undertaken by the Contractor as per the proforma mutually agreed with BHEL, Submission of monthly progress reports and any such document as and when desired by BHEL/owner, taking approval of all statutory authorities i.e Boiler Inspector, Factory Inspector, Inspector of Explosives etc , as applicable for respective portions of work fall under the jurisdiction of such statutes of laws.
2.10	Any other service, although not specifically called for but required for a contract of the size and nature indicated in the specification.

SPECIAL CONDITIONS OF CONTRACT (SCC)
Chapter - III : General Technical Requirements (Codes and Standards)

3.0	GENERAL TECHNICAL REQUIREMENTS (CODES AND STANDARDS)
3.1	Except where otherwise specified, the plant/equipment shall comply with the appropriate Indian Standard or an agreed internationally accepted Standard Specification as mentioned elsewhere in contract specifications, each incorporating the latest revisions at the time of tendering. Where no internationally accepted standard is applicable, the Bidder shall give all particulars and details as necessary, to enable BHEL to identify all of the plant/equipment in the same detail as would be possible had there been a Standard Specification.
3.2	Where the Bidder proposes alternative codes or standards he shall include in his tender one copy (in English) of each Standard Specification to which materials offered shall comply. In such case, the adopted alternative standard shall be equivalent or superior to the standards mentioned in the specification.
3.3	In the event of any conflict between the codes and standards referred above, and the requirements of this specification, the requirements which are more stringent shall govern.
3.4	Tools used during erection and commissioning shall not be accepted except with the specific approval of the Engineer.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - IV : Obligations of Contractor

4.0	OBLIGATIONS OF CONTRACTOR
4.1	CONSUMABLES & OTHER ITEMS
4.1.1	The contractor shall provide within finally accepted price / rates, all consumables (excepting those indicated in BHEL scope) like welding electrodes (including alloy steel and stainless steel), filler wires, TIG filler wires (over & above as supplied by the unit along with the plant materials, which will be given free of cost to bidder), gases (inert, welding, cutting), soldering material, dye penetrants, radiography films, etc. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, packers, shims, wooden planks, scaffolding materials hardware items etc required for temporary works such as supports, scaffoldings are to be arranged by the contractor. Sealing compounds, gaskets, gland packing, wooden/concrete sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by the contractor.
4.1.2	All the shims, gaskets and packing, which go finally as part of plant equipment, shall be supplied by BHEL free of cost.
4.1.3	It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non-availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.
4.1.4	Not Applicable.
4.1.5	It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc before procurement of welding electrodes. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number, date of expiry etc and produce test certificate for each lot / batch with correlation of batch / lot number with respective test certificate. No electrode without a valid test certificate will to be used.
4.1.6	BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required and records maintained.
4.1.7	Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - IV : Obligations of Contractor

4.1.8	In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time. Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the Contractor.
4.1.9	Not Applicable.
4.1.10	Not Applicable.
4.1.11	All charges on account of Octroi, terminal or sales tax and other duties on materials obtained from any source for carrying out the works in the scope of the contractor shall be borne by the contractor.
4.2	TOOLS AND PLANTS / MONITORING AND MEASURING EQUIPMENT (MMEs)
4.2.1	T&Ps and MMEs to be provided by Contractor
4.2.1.1	All T&Ps and MMEs excepting those specifically indicated in BHEL scope are to be provided by the Contractor. Contractor has to make his own arrangement at his cost for completing the formalities (including arrangement of Road permits, if any) if required with Sales Tax/VAT authorities, for bringing their materials, plants and equipments at site for the execution of work under this contract.
4.2.1.2	All suitable cranes, lifting and transport equipments for material handling at stores/yard/siding of BHEL/Customer are included in scope. BHEL's cranes will not be available for this purpose unless otherwise specifically permitted as per contract conditions
4.2.1.3	All T&Ps to be deployed by the contractor shall have the approval of BHEL Engineer with regard to brand, quality and specification.
4.2.1.4	Indicative list of Major T&Ps in the scope of Contractor are given in the Technical Conditions of Contract. Bidders to note that these are only indicative and as such all other T&P necessary for timely and satisfactory completion of work in scope shall be mobilized by Contractor
4.2.1.5	Timely deployment of adequate T&Ps is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned programme and to achieve the milestones.
4.2.1.6	Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - IV : Obligations of Contractor

4.2.1.7	In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make alternative arrangement at the risk and cost of the contractor. Decision of BHEL shall be final and binding on the contractor. It is not obligatory on the part of BHEL to provide any tools and tackles or other materials other than those specifically agreed to do so by BHEL. However, depending upon the availability, BHEL/ BHEL 's Customer handling equipment and other plants may be made available to the contractor on payment of hire charges as fixed, subject to the conditions laid down by BHEL/ Customer from time to time, Unless paid in advance, such hire charges, if applicable, shall be recovered from contractor's bill /security deposit or any other due payment in one instalment.
4.2.1.8	The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. The movements of cranes, and other equipment should be such that no damage / breakage occurs to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc shall be the contractor's responsibility.
4.2.1.9	Use of welding generators/ rectifiers only shall be permitted for welding. Use of welding transformers will be subject to specific approval of BHEL engineer.
4.2.1.10	The contractor at his cost shall carry out periodical testing of his construction equipments. Test certificates shall be furnished to BHEL.
4.2.1.11	Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Fitness certificate / Test Certificates of T&P shall have to be submitted before it is put in use. Identification for such T&Ps will be done as per BHEL Engineer's advice. BHEL reserves the right to permit only new slings up to 20 mm and lifting tackles up to 3 MT capacities.
4.2.1.12	Contractor shall ensure deployment of reliable and calibrated MMEs (Inspection measuring and Monitoring equipment). The MMEs shall have test / calibration certificates from authorized / Government approved / accredited agencies traceable to National / International standards. Each MME shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter - IV : Obligations of Contractor

4.2.1.13	Re-testing/ re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MME so that work does not suffer when the particular instrument is sent for calibration. If any MMEs not found fit for use, BHEL shall have the right to stop the use of such item. It will be necessary for the contractor to deploy proper item. Any readings taken by the defective instrument will be recalled and repeat the readings taken by that instrument with a proper one. In case he fails to do so, BHEL may deploy MMEs and retake the readings at contractor's cost.
4.2.1.14	BHEL shall have lien on all T&P, MMEs and other equipment of the contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of contract / extended period. The contractor and/ or his sub-contractors, without the prior written approval of the Engineer, shall remove no material brought to the site.
4.2.1.15	The month wise T&P deployment plan to execute the work is to be submitted as per relevant format as per the instruction of BHEL. It shall be the contractor's responsibility to deploy the required T&P, for timely and successful completion of the job, to any extent.
4.2.2	Not Applicable.

SPECIAL CONDITIONS OF CONTRACT (SCC)
**Chapter – V : Responsibilities of Contractor in respect of Labour,
Supervisory Staff, etc.**

5.0	RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF LABOUR, SUPERVISORY STAFF, ETC.
5.1	Refer relevant clauses of General Conditions of Contract (GCC) also in this regard
5.2	The contractor shall deploy all the necessary skilled/semiskilled/ unskilled labour including highly skilled workmen etc. These workmen should have previous experience on similar job. They shall hold valid certificates wherever necessary. BHEL reserves the right to insist on removal of any employee of the contractor at any time if he is found to be unsuitable and the contractor shall forthwith remove him.
5.3	Contractor shall also comply with the requirements of local authorities/ project authorities calling for police verification of antecedents of the workmen, staff etc.
5.4	It is the responsibility of the contractor to engage his workmen in shifts and or on overtime basis for achieving the targets set by BHEL. This target may be set to suit BHEL's commitments to its customer or to advance date of completion of events or due to other reasons. The decision of BHEL in regard to setting the erection and commissioning targets will be final and binding on the contractor.
5.5	Contractor shall provide at different elevation suitable arrangement for urinal and drinking water facility with necessary plumbing & disposal arrangement including construction of septic tank. These installations shall be maintained in hygienic condition at all times.
5.6	The Contractor in the event of engaging 20 or more workmen, shall obtain Independent license under the Contract labour (Regulation and Abolition) Act 1970 from the concerned authorities based on Form-V issued by the Principal Employer/Customer. In order to issue Form-V by Customer, Contractor shall fulfill all Statutory requirements like Insurance Policy, PF Code/PF Account number etc as per the requirement of BHEL/Customer
5.7	Contractor shall deduct the necessary amount towards Provident Fund and contribute equal amount as per Government of India laws. This amount will be deposited regularly to the provident Fund Commissioner. BHEL/Customer may insist for submission of the account code duly certified by PF Commissioner
5.8	Contractor may also be required to comply with provisions of ESI Act in vogue if applicable and submit evidence to BHEL.
5.9	BHEL / customer may insist for witnessing the regular payment to the labour. They may also like to verify the relevant records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL/ Customer.

SPECIAL CONDITIONS OF CONTRACT (SCC)
Chapter – V : Responsibilities of Contractor in respect of Labour,
Supervisory Staff, etc.

5.10	Contractor shall deploy only qualified and experienced engineers/ supervisors. They shall have professional approach in executing the work.
5.11	The contractor's supervisory staff shall execute the work in the most professional manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/instructions given by BHEL engineer from time to time.
5.12	The supervisory staff employed by the contractor shall ensure proper outturn of work and discipline on the part of the labour put on the job by the contractor. Also in general they should see that the works are carried out in a safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL's client.
5.13	It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc for entering the project premises. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer / BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permits for working beyond normal working hours.
5.14	The actual deployment will of Labour and Engineer/supervision staff shall be so as to satisfy the erection and commissioning targets set by BHEL. If at any time, it is found that the contractor is not in a position to deploy the required engineers/supervisors/workmen due to any reason, BHEL shall have the option to make alternate arrangements at the contractor's risk and cost. The expenditure incurred along with BHEL overheads thereon shall be recovered from the contractor.
5.15	Contractor shall not deploy women labour at night.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter – VI: Material Handling, Storage & preservation

6.0	MATERIAL HANDLING, STORAGE AND PRESERVATION ETC
6.1	MATERIAL HANDLING AND STORAGE
6.1.1	All the equipments/ materials furnished under this contract shall be received from the project stores, sheds / storage yards and transported to pre assembly area / erection site and stored in the storage spaces in a manner so that they are easily retrievable till the contractor erects them. While drawing/lifting material from BHEL / customer stores, the contractor shall ensure that the balance / other materials are stacked back immediately. No claim is admissible on this account
6.1.2	While BHEL will endeavor to store / stack / identify materials properly in their open / close / semi closed / tarpaulins covered storage yard / shed, it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection. They should take the delivery of the same, following the procedure indicated by BHEL, and transport the material safely to pre-assembly yard / erection site in time, according to program.
6.1.3	The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.
6.1.4	The contractor shall identify and deploy necessary Engineers / supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for areas covering their scope.
6.1.5	All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes / slings etc. shall be used for unloading / handling. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.
6.1.6	Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings / shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. Dragging of piping / valves should be avoided. In case of any damage the cost shall be covered from the contractor.
6.1.7	Approach road conditions from the stores/ yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials under the above

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter – VI: Material Handling, Storage & preservation

	circumstances without any extra cost. The contractor may familiar himself with soil conditions at site.
6.1.8	Contractor shall be responsible for examining all the plant and materials issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc. before they are moved out of the stores / storage area. The contractor shall be solely responsible for any shortages or damages in transit, handling, storage and erection of the equipment once received by him. As the erection work will be spread in different areas/ locations of the project, contractor has to arrange sufficient number of watch / ward personal to avoid any pilferage of material
6.1.9	The contractor shall maintain an accurate and exhaustive record-detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.
6.1.10	All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground. All covering materials including blocks and sleeper shall be arranged by the contractor at his cost.
6.1.11	If the material belonging to the contractor are stored in area other than those earmarked for his operation the engineer will have the right to get it moved to the area earmarked for the contractor at the contractors risk and cost.
6.1.12	The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL/ customer stores), which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage, and the contractor shall comply with Engineer's decision.
6.1.13	The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc are returned to BHEL at a place in project area identified by the Engineer. The contractor will maintain an account for all items received and returned to BHEL. Any shortage in returning such items shall be chargeable to the contractor except allowable wastage for packing wood only.
6.1.14	The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the stores as directed by the concerned BHEL engineer.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter – VI: Material Handling, Storage & preservation

6.1.15	The contractor shall ensure that all the packing materials and protective devices installed on equipment during transit and storage are removed before installation.
6.1.16	It shall be the responsibility of the contractor to keep the work / storage areas in neat, tidy and working conditions. All surplus/unusable packing and other materials shall be removed and deposited at location(s) specified by BHEL within the project premises. If required weighing of the same within the project premises will have to be carried out.
6.2	PRESERVATION OF COMPONENTS
6.2.1	After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.
6.2.1.1	Items stored outdoors shall be stacked up at least six inches (6") off the ground. Items should not be stored in a low lying area where water logging is a possibility. Contractor should have sufficient numbers of wooden / concrete / steel sleepers for the job.
6.2.1.2	Motors, valves, electrical equipment, control equipment and instruments, and special or precision items requiring special care, etc shall be stored indoors. Motor windings shall be kept dry by use of external heat or space heaters.
6.2.1.3	Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean and should be regularly monitored.
6.2.1.4	Insulation materials shall be stored indoors or otherwise protected against getting wet/ damaged, using suitable measures and should be protected from direct rain.
6.2.2	It shall be the responsibility of the contractor to apply preservatives / touch up paints (primer) on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required paints (primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc, cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out.
6.2.3	The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.

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Chapter – VI: Material Handling, Storage & preservation

6.2.4	Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.

SPECIAL CONDITIONS OF CONTRACT (SCC)
Chapter – VII: Drawings and documents

7.0	DRAWINGS AND DOCUMENTS
7.1	The detailed drawings, specifications available with BHEL engineers will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.
7.2	Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan, which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.
7.3	The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete ones from work place and returning to BHEL.
7.4	The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work. The contractors quoted rates shall be inclusive of the above factor
7.5	Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
7.6	Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter – VIII: Inspection and Quality

8.0	INSPECTION AND QUALITY
8.1	Inspection, Quality Assurance, Quality Control
8.1.1	Preparation of quality assurance log sheets and protocols with customer/ consultants/statutory authority, welding logs, NDE records, testing & calibration records and other quality control and quality assurance documentation as per BHEL engineer's instructions, is within the scope of work/specification. These records shall be submitted to BHEL/customer for approval from time to time.
8.1.2	The protocols between contractor and customer/ BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of installation, generally as per the requirement of customer/ BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.
8.1.3	A daily log book should be maintained by every supervisor/engineer of contractor on the job in duplicate (one for BHEL and one for contractor) for detailing and incorporating alignment/clearance / centering / leveling readings and inspection details of various equipments etc. High pressure welding details like serial number of weld joints, welders name, date of welding, details of repair, heat treatment etc. will be documented in welding log as per BHEL Engineer's instructions. Record of radiography containing details like serial number of weld joints, date of radiography, repairs, if any, re-shots etc shall also be maintained as per BHEL Engineer's instructions. Record of heat treatments performed shall be maintained as prescribed by BHEL
8.1.4	The performance of welders will be reviewed from time to time as per the BHEL standards. Welders' performance record shall be periodically furnished for scrutiny of BHEL's Engineer. Corrective action as informed by BHEL shall be taken in respect of those welders not conforming to these standards. This may include removal/ discontinuance of concerned welder(s). Contractor shall arrange for the alternate welders immediately
8.1.5	All the welders shall carry identity cards as per the proforma prescribed by BHEL/ Customer/ Consultant. Only welders duly authorized by BHEL/ customer/ consultant shall be engaged on the work.

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Chapter – VIII: Inspection and Quality

8.1.6	Contractor shall provide all the Measuring Monitoring Equipments (MMEs) required for completion of the work satisfactorily. These MMEs shall be of brand, quality and accuracy specified by BHEL Engineer and should have necessary calibration and other certificates as per the requirement of BHEL Engineer. Decision of BHEL Engineer regarding acceptance or otherwise of the measuring instruments/gauges/tools for the work under this specification, is final and binding on the contractor. BHEL may give an indicative list of MMEs required for this work and to be made available by the contractor. The list will be reviewed by BHEL and the contractor shall meet any augmentation needed wherever required.
8.1.7	It is the responsibility of the contractor to prove the accuracy of the testing/measuring/calibrating equipments brought by him based on the periodicity of calibration as called for in the BHEL's quality assurance standards/BHEL Engineer's instructions.
8.1.8	Any re-laying or re-termination of cables/re-erection of instruments/ recalibration of instruments etc. required due to contractor's mistake or design requirement and found at any stage inspection, shall be carried out by the contractor at no extra cost.
8.1.9	BHEL, Power Sector Regions (PSNR/PSER/PSWR/PSSR) have already been accredited with ISO 9001 certification and as such this work is subject to various audits to meet ISO 9001 requirements. One particular aspect which needs special mention is about arrangement of calibration of instruments by the contractor. Contractor shall ensure deployment of reliable and calibrated MMEs (Measuring and Monitoring Equipments). The MMEs shall have test / calibration certificates from authorised / Government approved / Accredited agencies traceable to National / International Standards. Re-testing / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MMEs so that work does not suffer when the particular equipment / instrument is sent for calibration. Also if any MMEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall ie repeat the readings taken by that instrument, failing which BHEL may deploy MME and retake the readings at Contractor's cost.
8.1.10	Re-work necessitated on account of use of invalid MMEs shall be entirely to the contractor's account. He shall be responsible to take all corrective actions,

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Chapter – VIII: Inspection and Quality

	including resource augmentation if any, as specified by BHEL to make-up for the loss of time.
8.1.11	In the courses of erection, it may become necessary to carry repeated checks of the work with instruments recently calibrated, re-calibrated. BHEL may counter/ finally check the measurements with their own MMEs. Contractor shall render all assistance in conduct of such counter/final measurements.
8.1.12	Total Quality is the watchword of the work and Contractor shall strive to achieve the Quality Standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and Quality Standards.
8.2	Stage Inspection By FES/QA Engineers
8.2.1	Apart from day-to-day inspection by BHEL Engineers stationed at Site and Customer's Engineers, stage inspection of equipments under erection and commissioning at various stages shall also be conducted by teams of Engineers from Field Engineering Services of BHEL's Manufacturing Units, Quality Assurance teams from Field Quality Assurance, Unit/Factory Quality Assurance and Commissioning Engineers from Technical Services etc. Contractor shall arrange all labour, tools and tackles etc along with proper access for such stage inspections free of cost.
8.2.2	Any modifications suggested by BHEL FES and QA Engineers' team shall be carried out. Claims of contractor, if any, shall be dealt as per Section 13, and provided such modifications have not arisen for reasons attributable to the contractor.
8.3	Statutory Inspection of Work
8.3.1	The work to be executed under these specifications has to be offered for inspection, at appropriate stages of work completion, to various statutory authorities for compliance with applicable regulations. The work related statutory inspections, though not limited to, are as under: 1) Inspectorate of Steam Boilers and Smoke Nuisance 2) Electrical Inspector 3) Factory Inspector, Labour Commissioner, PF Commissioner and other authority connected to this project work The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per

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Chapter – VIII: Inspection and Quality

	BHEL Engineer's instructions, arranging materials for ground inspection, taking rub outs for the pressure parts to be offered for inspection, submitting co-related inspection reports, documents, radiographs etc and following up the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority.
8.3.2	Not Applicable.
8.3.3	Not Applicable.
8.3.4	Not Applicable.
8.4	The Quality Management System of BHEL, Power Sector Regions (PSNR/ PSER/ PSWR/ PSSR) have already been certified and accredited under ISO 9002 standards in this regard. The basic philosophy of the Quality Management System is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product/ procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers/vendors of various products/services contributing in the work are also considered as part of the quality management system. .as such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.
8.5	Field Quality Assurance
8.5.1	Contractor shall carry out all activities conforming to the approved Field Quality Plan (FQP) as revised from time to time. Total quality shall be the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor shall provide the services of quality assurance engineer as per the relevant clauses.
8.6	Contractor has to fulfil quality requirement as per this chapter. In case of any gap in fulfilling these requirements by the contractor, financial penalty shall be imposed on the contractor with the rate mentioned in the "MEMO for penalty imposition against non-compliance in Quality area" enclosed as Annexure-IV.

SPECIAL CONDITIONS OF CONTRACT (SCC)
Chapter-IX:HSE & OHSAS

9.0	OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT MANAGEMENT/ QUALITY ASSURANCE PROGRAMME : BHEL, Power Sector Regions (PSNR/ER/WR/SR) are each certified for ISO 9001. Quality of work to customer's satisfaction and fulfillment of system requirements are the essence of ISO 9001 certification. BHEL, PS Regions have HSE certification (ISO 14001 & OHSAS 18001) and therefore Contractor also shall organise/ plan/ perform all their activities to meet with the applicable requirements of these standards.
9.1	HSE (Health, Safety & Environment): Contractor will comply with HSE (Health, safety & Environment) requirements of BHEL as per the "HSE Plan for Site Operations by Subcontractor" (Document no. HSEP:14 Rev 01) <u>Please see the attached document</u>
9.2	In case of any financial deduction made by Customer for lapses of safety other than what is provided above or elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract.

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter-X: RA Bill Payments

10.0	RA Bill Payments
10.1	The contractor shall submit his monthly RA bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month.
10.2	Mode of payment and measurement of work completed shall be as per relevant clauses of General Conditions of Contract
10.3	Release of payment in each running bill including PVC Bills where ever applicable will be restricted to 95% of the value of work admitted as per stages of progressive pro rata payments.
10.4	The 5% thus remaining shall be treated as 'Retention Amount' and shall be released as per terms specified in the General Conditions of Contract.
10.5	The payment for running bills will normally be released within 30 days of submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc and other dues in the meanwhile. In case of Civil works, 60% of RA Bills complete and correct in all respects and certified by BHEL Engineer, shall be paid within 15 days of receipt. Balance payment shall be within 30 days.
10.6	BHEL shall release payment through Electronic Fund Transfer (EFT)/RTGS. In order to implement this system, Contractor to furnish details pertaining to his Bank Accounts where proceeds will be transferred through BHEL's banker, as per prescribed formats: Note: BHEL may also choose to release payment by other alternative modes as applicable
10.7	Paying Authority shall be the Construction Manager of the Site. Any change in the paying Authority shall be intimated to the Contactor accordingly.

SPECIAL CONDITIONS OF CONTRACT (SCC)
Chapter-XI : Performance Monitoring

11.0	Performance Monitoring
11.1	Performance of the contractor is monitored through various reports/reviews and shall be jointly evaluated every month for unit wise identified packages as per prescribed formats. Based on the net weighted scores obtained, Contractors shall be rated 'Good' or 'Satisfactory' or 'Unsatisfactory'
11.2	In case of any dispute on performance rating and the contractor refuses to sign on the performance rating given by BHEL package Incharge, the same shall be reviewed by BHEL site Incharge/Construction Manager and his decision shall be final.
11.3	Release of RA Bills will be contingent upon joint evaluation of performance
11.4	Performance of the contractor will be taken into consideration for assessing the capacity of the bidder to execute future jobs under tender, as detailed in the Notice Inviting Tender. Risk of non evaluation or non availability of the Monthly performance evaluation reports is to be borne by the Bidder.
11.5	In case of 'Unsatisfactory performance' for a continuous period of three or more months for a package or packages, BHEL has the right to get the balance works executed at the risk and cost of the contractor.
11.6	In case of 'Unsatisfactory performance' in a financial year, BHEL reserves the right to put on hold such Contractors for a period of six months for similar package or similar packages

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter-XII: Suspension of Business Dealings

12.0	Suspension of Business dealings
12.1	BHEL reserves the right to take action against contractors who fail to perform or indulge in malpractices, by suspending business dealings with them.
12.2	Suspension could be in the form of 'Hold', 'De-listing' or 'Banning' a contractor.
12.3	A bidder may be put on HOLD for a period of 6 months, for future tenders for specific works on the basis of one or more of the following reasons: a) Bidder does not honour his own offer or any of its conditions within the validity period. b) Bidder fails to respond against three consecutive enquires of BHEL. c) After placement of order, Bidder fails to execute a contract. d) Bidder fails to settle sundry debt account, for which he is legitimately liable, within one year of its occurrence. e) Bidder's performance rating falls below 60% in specific category (more fully described in chapter 'Performance Monitoring') f) Bidder works are under strike/ lockout for a long period.
12.4	A Bidder may be de-listed from the list of registered Bidders of the region for a period of 1 year on the basis of one or more of the following reasons:- a) Bidder tampers with tendering procedure affecting ordering process or commits any misconduct which is contrary to business ethics. b) Bidder has substituted, damaged, failed to return, short returned or unauthorizedly disposed off materials/ documents/ drawings/ tools etc of BHEL. c) Bidder no longer has the technical staff, equipment, financial resources etc. required to execute the orders/ contracts.
12.5	A Bidder can be banned from doing any business with all Units of BHEL for a period of 3 years on the basis of one or more of the following reasons: a) Bidder is found to be responsible for submitting fake/ false/ forged documents, certificates, or information prejudicial to BHEL's interest. b) In spite of warnings, the Bidder persistently violates or circumvents the provisions of labour laws/ regulations/ rules and other statutory requirements. c) Bidder is found to be involved in cartel formation

SPECIAL CONDITIONS OF CONTRACT (SCC)

Chapter-XII: Suspension of Business Dealings

	d) The Bidder has indulged in malpractices or misconduct such as bribery, corruption and fraud, pilferage etc which are contrary to business ethics. e) The Bidder is found guilty by any court of law for criminal activity/ offences involving moral turpitude in relation to business dealings. f) The Bidder is declared bankrupt, insolvent, has wound up or been dissolved; i.e ceases to exist for all practical purposes. g) Bidder is found to have obtained Official Company information/ documentation by questionable means. h) Communication is received from the administrative Ministry of BHEL to ban the Bidder from business dealings.
12.6	Contracts already entered with a contractor before the date of issue of order of 'HOLD' or 'DE-LISTING' shall not be affected.
12.7	All existing contracts with a 'BANNED' contractor shall normally be short closed
12.8	Once the order for suspension is passed, existing offers/new offers of the contractor shall not be entertained
12.9	The above guidelines are not exhaustive but enunciate broad principles governing action against contractors



Bharat Heavy Electricals Limited

(A Govt. of India Undertaking)

Power Sector- Northern Region

BHEL/PSNR/Site.....

Dated: _____

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

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

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

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

Penalty imposed:-

1, Rate as per above chart _____

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

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

Signature

(Witnessed by Sub- Contractor representative)

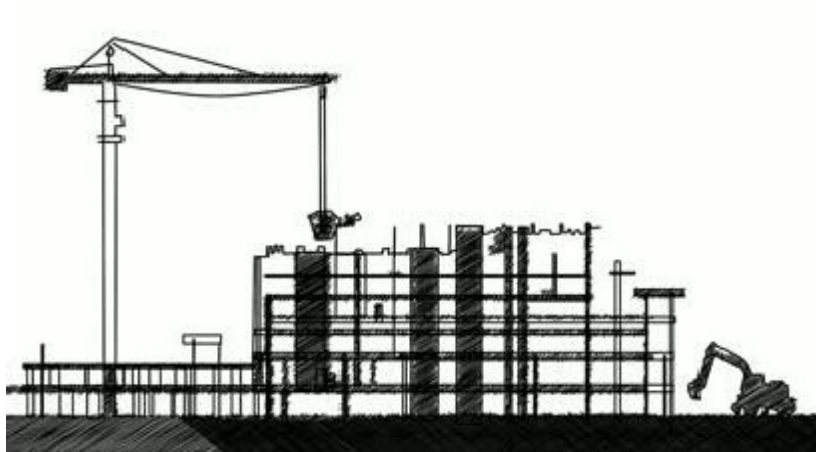
Name _____

(Witnessed by PSNR Personnel)

Name _____

Distribution: 1. Sub- contractor

2. Head (Quality & Safety)/ BHEL PSNR



HEALTH, SAFETY and ENVIRONMENT PLAN

for

**SITE
OPERATIONS**

by

**SUB-
CONTRACTORS**

POWER SECTOR

HSE PLAN FOR SITE OPERATIONS BY BHEL'S SUBCONTRACTORS

AT A GLANCE

BEFORE START	SIGNING OF MOU	
	Agree to comply to HSE requirement- Statutory and BHEL’s	
PLAN	HSE ORGANISATION	
	Manpower 1 (one) safety officer for every 500 workers or part thereof 1(one) safety-steward/ supervisor for every 100 workers Qualification As per Cl. 7.1	HSE Roles and responsibilities - Site In-charge- As per clause 7.2.1 - Safety officer- As per clause 7.2.2
	HSE Planning for Man, Machinery/Equipment/Tools & Tackles	
PROVIDE	HSE INFRASTRUCTURE	
	- PPEs - Drinking Water - Washing Facilities - Latrines and Urinals - Provision of shelter for rest - Medical facilities	- Canteen facilities - Labour Colony - Emergency Vehicle - Pest Control - Scrapyard - Illumination
TRAIN	HSE TRAINING , AWARENESS & PROMOTION	
	Training - Induction training - Height work and other critical areas - Tool Box talk & Pep Talk	Awareness & Promotion - Signage - Poster - Banner - Competition - Awards
COMMUNICATE	HSE COMMUNICATION	
	Incident Reporting - Accident- Fatal & Major - Property damage - Near Miss	Event Reporting - Celebrations - Training - Medical camp

EXECUTE SAFELY

OPERATIONAL CONTROL PROCEDURES

PERMIT TO WORK

Height work (above 2 metres), Hot Work, Heavy Lifting, Confined Space, Radiography, excavation (More than 4 metres)

SAFETY DURING WORK EXECUTION

• Welding • Rigging • Cylinder- storage & Movement • Demolition work • T&Ps • Chemical Handling • Electrical works	• Fire • Scaffolding • Height work • Working Platform • Excavation • Ladder • Lifting • Hoisting appliance

HOUSE KEEPING

WASTE MANGEMENT

TRAFFIC MANAGEMENT

ENVIRONMENTAL CONTROL

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

CHECKS

HSE AUDITS & INSPECTION

• Daily Checks • Inspection of PPEs • Inspection of T& Ps • Inspection of Cranes & Winches	• Inspection of Height work • Inspection of Welding and Gas cutting • Inspection of elevators etc.

HSE PERFORMANCE EVALUATION PARAMETERS

NON CONFORMANCE

PENALTY for NON CONFORMANCE

Refer Clause 16

Incremental penalty

For repeated violation by the same person, the penalty would be double of the previous penalty

For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS		Doc no.: HSEP: 14
	POWER SECTOR		REV: 01
			Date: 20.01.2020

REVISION HISTORY SHEET

Date	Revision No.	Details of Changes	Reason	Prepared	Reviewed	Approved
12.08.2014	00	First Issue	First Issue	S. B. Jayant, Dy Manager- FQA & Safety	A. K. Sinha, GM-FQA & Safety	Anuj Bhatnagar, ED-FQA & Safety
20.01.2020	01	Formats added: HSEP:14-F30 – Monthly HSE Planning & Review (Page 11, Clause 8.0 - updated) HSEP:14-F13E-Excavation Inspection Format (part of F30)) HSEP:14-F32B – Job Safety Analysis Format (part of F30) HSEP:14-F31A – Daily HSE Reporting (Page 18, Clause 10.3 – added) HSEP:14-F33 – HSE Performance Evaluation (Page 31, Clause 13 – revised)	IOM No. PSHQHSE/M ONREP/02 Dated 08-Jan-2020	Rohit Kumar	Santosh Nair, GM (MSX & HSE)	



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1.0 PURPOSE

- 1.1** The purpose of this HSE Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during installation and servicing of industrial projects and power plants.
- 1.2** This document shall be followed by BHEL's subcontractors at all installation and servicing sites. In case customer specific documents are to be implemented, this document will be followed in conjunction with customer specific documents.
- 1.3** Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.
- 1.4** In case the customer has any specific requirement, the same is to be fulfilled.

2.0 SCOPE

The document is applicable for BHEL's Subcontractors at all installation / servicing activities of BHEL Power Sector as per the relevant contractual obligations.

3.0 OBJECTIVES AND TARGETS

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces.

- Ensure the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment of the work site.
- Comply at all times with the relevant statutory and contractual HSE requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their work.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including subcontractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps/Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent person.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.
- Ensure continual improvements in HSE performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.



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HSE TARGETS

EXPLOSION	ZERO
FATALITY	ZERO
LOST TIME INJURY	ZERO
FIRE	ZERO
VEHICLE INCIDENTS	ZERO
ENVIRONMENTAL INCIDENTS	ZERO

4.0 BHEL POWER SECTOR HEALTH, SAFETY & ENVIRONMENT POLICY

Power Sector HSE Policy

We, at BHEL Power Sector, reaffirm our belief that the Health and Safety of our stakeholders and conservation of Environment is of utmost importance and takes precedence in all our business decisions. In pursuit of this belief and commitment, we strive to:

- ✓ Ensure total compliance with applicable legislation, regulations and other requirements concerning Occupational Health, Safety and Environment.
- ✓ Ensure continual improvement in the Occupational Health, Safety and Environment Management System performance.
- ✓ Enhance Occupational Health, Safety and Environment awareness amongst employees, customers and suppliers by proactive communication and training.
- ✓ Review periodically and improve Occupational Health, Safety and Environment Management System to ensure its continuing suitability, adequacy and effectiveness in a continuously changing business environment.
- ✓ Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees to fulfill their Health, Safety and Environmental obligations.
- ✓ Incorporate appropriate Occupational Health, Safety and Environmental criteria into business decisions for selection of plant, technology and services as well as appointment of key personnel.
- ✓ Ensure availability at all times of appropriate resources to fully implement the Occupational Health, Safety and Environmental policy of the company.

This policy will be communicated to all employees and made available to interested parties.

Sd/-

Date: 01.05.2013

Director (Power)



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5.0 MEMORANDUM OF UNDERSTANDING:

After award of work, subcontractors are required to enter into a memorandum of understanding as given below:

Memorandum of Understanding

BHEL, Power Sector _____ Region is committed to Health, Safety and Environment Policy (HSE Policy).

M/s _____ do hereby also commit to comply with the same HSE Policy while executing the Contract Number _____

M/s _____ shall ensure that safe work practices as per the HSE plan. Spirit and content therein shall be reached to all workers and supervisors for compliance.

In addition to this, M/S _____ shall comply to all applicable statutory and regulatory requirements which are in force in the place of project and any special requirement specified in the contract document of the principal customer.

M/s _____ shall co-operate in HSE audits/inspections conducted by BHEL /customer/ third party and ensure to close any non-conformity observed/reported within prescribed time limit.

Signed by authorized representative of M/s -----

Name :

Place & Date:



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6.0 TERMS AND DEFINITIONS

6.1 DEFINITIONS

6.1.1 INCIDENT

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

6.1.2 NEAR MISS

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as "Near-Miss".

6.1.3 MAN-HOURS WORKED

The total number of man hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labours. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workdays for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

6.1.4 FIRST AID CASES

First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time.

6.1.5 LOST TIME INJURY

Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred.

6.1.6 MEDICAL CASES

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.

6.1.7 TYPE OF INCIDENTS & THEIR REPORTING:

The three categories of Incident are as follows:

Non-Reportable Cases:

An incident, where the injured person is given medical help and discharged for work without counting any lost time.



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Reportable Cases:

In this case the injured person is disable for 48 hours or more and is not able to perform his duty.

Injury Cases:

These are covered under the heading of non-reportable cases. In these cases the incident caused injury to the person, but he still continues his duty.

6.1.8 TOTAL REPORTABLE FREQUENCY RATE

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

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

6.1.9 SEVERITY RATE

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

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

6.1.10 INCIDENCE RATE

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

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

7.0 HSE ORGANISATION

Number of safety officers:

The subcontractor must deploy one safety officer for every 500 workers or part thereof in each package. In addition, there must be one safety-steward/safety-supervisor for every 100 workers.

Deployment: The subcontractor should deploy sufficient safety officers and safety-steward/Safety-supervisor, as per requirement given above, since initial stage and add more in proportion to the added strength in work force. Any delay in deployment will attract a penalty of Rs.30,000/- per man month for the delayed period.

7.1 QUALIFICATION FOR HSE PERSONNEL

Sl.no	Designation	Qualification	Experience
1	Safety officer (Construction Agency)	Degree or Diploma in Engineering with full-time diploma in Industrial Safety with construction safety as one of the subjects	Minimum two years for degree holder and five years for diploma holder in the field of Construction of power plant/ major industries



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2	~~Safety-Steward/ Safety-Supervisor~~	~~Degree or diploma in any discipline with full-time diploma in Industrial Safety with construction safety as one of the subjects~~	~~Minimum two years~~

7.2 RESPONSIBILITIES

7.2.1 SITE IN -CHARGE OF SUBCONTRACTOR

- ☐ Shall sign Memorandum of Understanding (MoU) for compliance to BHEL's HSE Plan for Site Operations as per clause 5.0
- Shall engage qualified safety officer(s) and steward (s) as per clause 7.0
- Shall adhere to the rules and regulations mentioned in this code, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like safety helmets, belts, full body harness, shoes, face shield, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in Factory Rule Regulation R57.
- Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent person.
- Shall ensure that provisions stipulated in contract Labour Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs) available with the site management.
- Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
- Shall ensure that Horseplay is strictly forbidden.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of HSE audit, mockdrill, medical camps, induction training and training on HSE at site.
- Shall ensure full co-operation during HQ/External /Customer HSE audits.



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- ☐ Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the work site.
- Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labour colony.
- Shall ensure adequate emergency preparedness.
- Shall be member of site HSE committee and attend all meetings of the committee
- Power source for hand lamps shall be maximum of 24 v.
- ☐ Temporary fencing should be done for open edges if Hand – railings and Toe-guards are not available.

7.2.2 HEALTH, SAFETY AND ENVIRONMENT OFFICER OF SUBCONTRACTOR

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Help concerned HOS to prepare Job Specific instructions for critical jobs.
- Conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
- Convene HSE meeting & minute the proceeding for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Report to PS Region/HQ on all matters pertaining to status of safety and promotional program at site level.
- Facilitate administration of First Aid
- Facilitate screening of workmen and safety induction.
- Conduct fire Drill and facilitate emergency preparedness
- Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- ☐ Apprise PS– Region on safety related problems.
- Notify site personnel non-conformance to safety norms observed during site visits / site inspections.
- Recommend to Site In charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
- Shall work as interface between various agencies such customer, package-in-charges, subcontractors on HSE matters



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8.0 PLANNING BY SUBCONTRACTOR

Monthly planning and review of HSE activities shall be carried out by subcontractor as per format No. HSEP:14-F30 jointly along with BHEL.

8.1 MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS BY SUBCONTRACTOR

- As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and complies with legislative and owner requirement, inspection shall be arranged by in-house competent authority for acceptance as applicable.
- The machinery and equipment to be embraced for this purpose shall include but not limited to the following:
 - Mobile cranes.
 - Side Booms.
 - Forklifts.
 - Grinding machine.
 - Drilling machine.
 - Aircompressors.
 - Welding machine.
 - Generator sets.
 - Dump Trucks.
 - Excavators.
 - Dozers
 - Grit Blasting Equipment.
 - Hand tools.
- Subcontractor shall notify the engineer, of his intention to bring on to site any equipment or any container, with liquid or gaseous fuel or other substance which may create a hazard. The Engineer shall have the right to prescribe the condition under which such equipment or container may be handled and used during the performance of the works and the subcontractor shall strictly adhere to such instructions. The Engineer shall have the right to inspect any construction tool and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition will be entertained.

8.2 MOBILISATION OF MANPOWER BY SUBCONTRACTOR

- The subcontractor shall arrange induction and regular health check of their employees as per schedule VII of BOCW rules by a registered medical practitioner.
- The subcontractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.
- Ensure that the regulatory requirements of excessive weight limit (to carry/lift/ move weights beyond prescribed limits) for male and female workers are complied with.
- Appropriate accommodation to be arranged for all workmen in hygienic condition.



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8.3 PROVISION OF PPEs

- Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured
- The following matrix recommends usage of minimum PPEs against the respective job.

Sl. No	Type of work	PPEs
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/ Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders
3	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Respiratory mask, Hand gloves, safety goggles
6	Work at height	Double lanyard full body harness, Fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves
8	Painting	Plastic gloves, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines

- The PPEs shall conform to the relevant standards as below and bear ISI mark.

Relevant is-codes for personal protection

IS: 2925 – 1984	Industrial Safety Helmets.
IS: 4770 – 1968	Rubber gloves for electrical purposes.
IS: 6994 – 1973 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves).
IS: 1989 – 1986 (Part-I-II)	Leather safety boots and shoes.
IS: 5557 – 1969	Industrial and Safety rubber knee boots.
IS: 6519 – 1971	Code of practice for selections care and repair of Safety footwear.
IS: 11226 – 1985	Leather Safety footwear having direct molding sole.
IS: 5983 – 1978	Eye protectors.
IS: 9167 – 1979	Ear protectors.
IS: 1179-1967	Eye & Face protection during welding
IS: 3521 – 1983	Industrial Safety Belts and Harness
IS: 8519 -1977	Guide for selection of industrial Safety equipment for body protection
IS: 9473-2002, 14166-1994, 14746-1999	Respiratory Protective Devices

The list is not exhaustive. The safety officer may demand additional PPEs based on specific requirement.



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- Where workers are employed in sewers and manholes, which are in use, the subcontractor shall ensure that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into manhole, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent incident to the public
- Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work.

Colour scheme for Helmets:

1. Workmen: Yellow
 2. Safety staff: Green or white with green band
 3. Electrician: Red
 4. Others including visitors: White
- All the PPEs shall be checked for its quality before issue and the same shall be periodically checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced.
 - The issuing agency shall maintain register for issue and receipt of PPEs.
 - The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front.
 - The body harnesses shall be serial numbered.

8.4 ARRANGEMENT OF INFRASTRUCTURE

8.4.1 DRINKING WATER

- Drinking water shall be provided and maintained at suitable places at different elevations.
- Container should be labeled as " Drinking Water"
- Cleaning of the storage tank shall be ensured atleast once in 3 months indicating date of cleaning and next due date.
- Potability of water should be tested as per IS10500 at least once in a year.

8.4.2 WASHING FACILITIES

- In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
- Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition and dully illuminated for night use.
- Overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work.

8.4.3 LATRINES AND URINALS

- Latrines and urinals shall be provided in every work place.
- Urinals shall also be provided at different elevations.
- They shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person.
- Separate facilities shall be provided for the use of male and female worker if any.



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8.4.4 PROVISION OF SHELTER DURING REST

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

8.4.5 MEDICAL FACILITIES

8.4.5.1 MEDICAL CENTRE (As per Schedule V, X and XI of BOCW central Rules, 1998)

- A medical centre shall be ensured/identified at site with basic facilities for handling medical emergencies. The medical center can be jointly developed on proportionate sharing basis with permission from BHEL
- A qualified medical professional, not less than MBBS, shall be deployed at the medical centre
- The medical centre shall be equipped with one ambulance, with trained driver and oxygen cylinder.
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste –Management and Handling Rules, 1998)

8.4.5.2 FIRST AIDER

- Ensure availability of Qualified First-aider throughout the working hours.
- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.
- List of Qualified first aiders and their contact numbers should be displayed at conspicuous places.

8.4.5.3 FIRST AID BOX (as per schedule III of BOCW)

- The subcontractor shall provide necessary first aid facilities as per schedule III of BOCW. At every work place first aid facilities shall be provided and maintained.
- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact no to be displayed on the box.
- The first aid boxes should be placed at various elevations so as to make them available within the reach and at the quickest possible time.
- The first aid box shall be distinctly marked with a Green Cross on white background.
- Details of contents of first aid box is given in Annexure No. 01
- Monthly inspection of First Aid Box shall be carried out by the owner as per format no. HSEP:14-F01
- The subcontractor should conduct periodical first –aid classes to keep his supervisor and Engineers properly trained for attending to any emergency.

8.4.5.4 HEALTH CHECK UP (As per schedule VII and Form XI)

The persons engaged at the site shall undergo health checkup as per the format no. HSEP:14-F02 before induction. The persons engaged in the following works shall undergo health checkup at least once in a year:

- a. Height workers
- b. Drivers/crane operators/riggers



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- c. Confined space workers
- d. Shot/sand blaster
- e. Welding and NDE personnel

8.4.6 PROVISION OF CANTEEN FACILITY

- ~~Canteen facilities shall be provided for the workmen of the project inside the project site.~~
- ~~Proper cleaning and hygienic condition shall be maintained.~~
- ~~Proper care should be taken to prevent biological contamination.~~
- ~~Adequate drinking water should be available at canteen.~~
- ~~Fire extinguisher shall be provided inside canteen.~~
- ~~Regular health check-up and medication to the canteen workers shall be ensured.~~

8.4.7 PROVISION OF ACCOMODATION/LABOUR COLONY

- ☐ The subcontractor shall arrange for the accommodation of workmen at nearby localities or by making a labour colony.
- ☐ Regular housekeeping of the labour colony shall be ensured.
- ☐ Proper sanitation and hygienic conditions to be maintained.
- ☐ Drinking water and electricity to be provided at the labour colony.
- ☐ Bathing/ washing bay
- ☐ Room ventilation and electrification.

8.4.8 PROVISION OF EMERGENCY VEHICLE

- ~~Dedicated emergency vehicle shall be made available at workplace by each subcontractor to handle any emergency~~

8.4.9 PEST CONTROL

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

8.4.10 SCRAPYARD

- ~~In consultation with customer, scrapyard shall be developed to store metal scrap, wooden scrap, waste, hazardous waste.~~
- ~~Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.~~

8.4.11 ILLUMINATION

- The subcontractor shall arrange at his cost adequate lighting facilities e.g. flood lighting, hand lamps, area lighting etc. at various levels for safe and proper working operations at dark places and during night hours at the work spot as well as at the pre-assembly area.
- Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II). Some recommended values are given below:



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

- Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.
- Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp.
- Emergency lighting provision for night work shall be made to minimise danger in case of main supply failure.

If the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor

9.0 HSE TRAINING& AWARENESS

9.1 HSE INDUCTION TRAINING

All persons entering into project site shall be given HSE induction training by the HSE officer of BHEL /subcontractor before being assigned to work.

In-house induction training subjects shall include but not limited to:

- Briefing of the Project details.
- Safety objectives and targets.
- Site HSE rules.
- Site HSE hazards and aspects.
- First aid facility.
- Emergency Contact No.
- Incident reporting.
- Fire prevention and emergency response.
- Rules to be followed in the labour colony (if applicable)



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- Proper safety wear & gear must be issued to all the workers being registered for the induction (i.e., Shoes/Helmets/Goggles/Leg guard/Apron etc.)
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
- On completing attending subcontractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP:14-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. They may only then be qualified to be issued with a personal I.D. card, for access to the work site.

9.2 HSE TOOLBOX TALK

- HSE tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups prior to the start of work. The agenda shall consist of the followings:
 - Details of the job being intended for immediate execution.
 - The relevant hazards and risks involved in executing the job and their control and mitigating measures.
 - Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
 - Recent non-compliances observed.
 - Appreciation of good work done by any person.
 - Any doubt clearing session at the end.
- Record of Tool box talk shall be maintained as per format no. HSEP:14-F04
- Tool box talk to be conducted at least once a week for the specific work.

9.3 TRAINING ON HEIGHT WORK

Training on height work shall be imparted to all workers working at height by in-house/external faculty at least twice in a year. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, retractable fall arrester, life line, safety nets etc.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.
- Dos & Don'ts during height work.

9.4 HSE TRAINING DURING PROJECT EXECUTION

- Other HSE training shall be arranged by BHEL/ subcontractor as per the need of the project execution and recommendation of HSE committee of site.
- The topics of the HSE training shall be as follows but not limited to:
 - Hazards identification and risk analysis (HIRA)
 - Work Permit System
 - Incident investigation and reporting
 - Fire fighting
 - First aid
 - Fire-warden training
 - EMS and OHSMS
 - T & Ps fitness and operation



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- Electrical safety
- Welding, NDE & Radiological safety
- Storage, preservation & material handling.
- A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out.

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

9.5.1 Display of HSE posters and banners

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

9.5.2 Display of HSE signage

- Appropriate HSE signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed

9.5.3 Competition on HSE and award

- Site will arrange different competition (slogan, poster, essay etc.) on HSE time to time (Safety day, BHEL day, World Environment Day etc.) and winners will be suitably awarded.

9.5.4 HSE awareness programme

- Subcontractor shall arrange HSE awareness programme periodically on different topics including medical awareness for all personnel working at site

10.0 HSE COMMUNICATION

10.1 INCIDENT REPORTING

- The subcontractor shall submit report of all incidents, fires and property damage etc to the Engineer immediately after such occurrence, but in any case not later than 24 hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. (Refer HSE procedure for incident investigation, analysis and reporting for details)
- In addition, periodic reports on safety shall also be submitted by the subcontractor to BHEL from time to time as prescribed by the Engineer. Compiled monthly reports of all kinds of incidents, fire and property damage to be submitted to BHEL safety officer as per prescribed formats.
- HSE incidents of site shall be reported to BHEL site Management as per Procedure for Incident Investigation and Reporting in format no. HSEP:14-F15. Corrective action shall be immediately implemented at the work place and compliance shall be verified by BHEL HSE officer and until then, work shall be put on hold by Construction Manager.

10.2 HSE EVENT REPORTING

- Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to BHEL site management in detail with photographs for publication in different in-house magazines
- Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above.

10.3 DAILY HSE ACTIVITY REPORTING

Daily HSE activities shall be reported by subcontractor to BHEL as per Format No. HSEP:14-F31A



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11.0 OPERATIONAL CONTROL

All applicable OCPs (Operational control procedures) will be followed by subcontractor as per BHEL instructions. This will be done as part of normal scope of work. List of such OCPs is given below. In case any other OCP is found to be applicable during the execution of work at site, then subcontractor will follow this as well, within quoted rate. These OCPs (applicable ones) will be made available to subcontractor during work execution at site. However for reference purpose, these are kept with Safety Officer of BHEL at the Power Sector Regional HQ, or available in downloadable format in the website, which may be refereed by subcontractor, if they so desire.

LIST OF OCPs

Safe handling of chemicals	Safety in use of cranes	Hydraulic test
Electrical safety	Storage and handling of gas cylinders	Spray insulation
Energy conservation	Manual arc welding	Trial run of rotary equipment
Safe welding and gas cutting operation	Safe use of helmets	Stress relieving
Fire safety	Good house keeping	Material preservation
Safety in use of hand tools	Working at height	Cable laying/tray work
First aid	Safe excavation	Transformer charging
Food safety at canteen	Safe filling of hydrogen in cylinder	Electrical maintenance
Illumination	Vehicle maintenance	Safe handling of battery system
Handling and erection of heavy metals	Safe radiography	Computer operation
Safe acid cleaning	Waste disposal	Storage in open yard
Safe alkali boil out	Working at night	For sanitary maintenance
Safe oil flushing	Blasting	Batching
Steam blowing	DG set	Piling rig operation
Safe working in confined area	Handling & storage of mineral wool	Gas distribution test
Safe operation of passenger lift, material hoists & cages	Drilling, reaming and grinding(machining)	Cleaning of hotwell / deaerator
Electro-resistance heating	Compressor operation	O&M of control of AC plant & system
Air compressor	Passivation	Safe Loading of Unit
Safe EDTA Cleaning	Safe Chemical cleaning of Pre boiler system	Safe Boiler Light up
Safe Rolling and Synchronization		

11.1 HSE ACTIVITIES

HSE activities shall be conducted at site based on the HSEMSM developed by Power Sector and issued to site by Regions.

While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures:

- 1) HSE Procedure for Register of OHS Hazards and Risks
- 2) HSE Procedure for Register of Environmental Aspects and Impacts
- 3) HSE Procedure for Register of Regulations



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- 4) Operational Control Procedures
- 5) HSE Procedure for Emergency Preparedness and Response Plan
- 6) Contract documents

11.2 WORK PERMIT SYSTEM

- ☐ The following activities shall come under Work Permit System
 - a. Height working above 2 metres
 - b. Hot working at height
 - c. Confined space
 - d. Radiography
 - e. Excavation more than 4 meter depth
 - f. Heavy lifting above 50 tonRefer Annexure 05 for Work permit formats.
- "HSE Procedure for Work Permit System" shall be followed while implementing permit system. Where customer is having separate Work Permit System the same shall be followed.
- ☐ Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work with Job Hazard Analysis.
- ☐ Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- ☐ Permit holder shall implement and maintain all control measures during the period of permit .He will close the permit after completion of the work. The closed permit shall be archived in HSE Department of site.

11.3 SAFETY DURING WORK EXECUTION

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

11.3.1 WELDING SAFETY

All safety precautions shall be taken for welding and cutting operations as per IS-818. All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.

11.3.2 RIGGING

Rigging equipment shall not be loaded in excess of its recommended safe working load. Rigging equipment, when not in use, shall be removed from the original work area so as not to present a hazard to employees.

11.3.3 CYLINDERS STORAGE AND MOVEMENT

All gas cylinders shall be stored in upright position. Suitable trolley shall be used. There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. Damaged tube and regulators must be immediately replaced. No of cylinders shall not exceed the specified quantity as per OCP

Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dragged, struck or permitted to strike each other violently.



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When cylinders are transported by powered vehicle they shall be secured in a vertical position.

11.3.4 DEMOLITION WORK

Before any demolition work is commenced and also during the process of the work the following shall be ensured:

- All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- No electric cable or apparatus which is liable to be a source of danger nor a cable or an apparatus used by the operator shall remain electrically charged.
- All practical steps shall be taken to prevent danger to persons employed from the risks of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render them unsafe.

11.3.5 T&Ps

All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test/calibration certificates bearing endorsement from competent authority of BHEL..Subcontractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.

11.3.6 CHEMICAL HANDLING

~~Displaying safe handling procedures for all chemicals such as lube oil, acid, alkali, sealing compounds etc, at work place. Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the subcontractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The subcontractor shall be responsible for obtaining the same.~~

11.3.7 ELECTRICAL SAFETY

- Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts.
- Fulfilling safety requirements at all power tapping points.
- High/ Low pressure welders to be identified with separate colour clothings. No welders will be deployed without passing appropriate tests and holding valid welding certificates. Approved welding procedure should be displayed at work place.
- The subcontractor shall not use any hand lamp energized by Electric power with supply voltage of more than 24 volts in confined spaces like inside water boxes, turbine casings, condensers etc.
- All portable electric tools used by the subcontractor shall have safe plugging system to source of power and be appropriately earthed. Only electricians licensed by appropriate statutory authority shall be employed by the subcontractor to carry out all types of electrical works. Details of earth resource and their test date to be given to BHEL safety officer as per the prescribed formats of BHEL
- The subcontractor shall use only properly insulated and armored cables which conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site.



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- BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the cost of the subcontractor.
- All electrical appliances used in the work shall be in good working condition and shall be properly earthed.
- No maintenance work shall be carried out on live equipment.
- The subcontractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations.
- Area wise Electrical safety inspection is to be carried out on monthly basis as per "Electrical Safety Inspection checklist" and the report is to be submitted to BHEL safety officer
- Adequate precautions shall be taken to prevent danger for electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public
- The subcontractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.

11.3.8 FIRE SAFETY

- Providing appropriate fire fighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
- Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labor colony etc. Such fire protection equipment shall be easy and kept open at all times.
- The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders.
- All other fire safety measures as laid down in the "codes for fire safety at construction site" issued by safety coordinator of BHEL shall be followed.
- Non-compliance of the above requirement under fire protection shall in no way relieve the subcontractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others.
- Emergency contacts nos must be displayed at prominent locations
- Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site.

11.3.9 SCAFFOLDING

- Suitable scaffolds shall be provided for workman for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration of work which can be done safely from ladders.
- When a ladder is used, it shall be of rigid construction made of steel. The steps shall have a minimum width of 45 cm and a maximum rise of 30 cm. Suitable handholds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than ¼ horizontal and 1 vertical.
- Scaffolding or staging more than 3.6 m above the ground floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly bolted, braced or otherwise secured, at least 90 cm above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from savor, from swaying, from the building or structure.

11.3.10 WORK AT HEIGHT:

- Guardrails and toe-board/barricades and sound platform conforming to IS:4912-1978 should be provided.



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- Wherever necessary, life-line (pp or metallic) and fall arrestor along with Polyamide rope or Retractable lifeline should be provided.
- Safety Net as per IS:11057:1984 should be used extensively for prevention/ arrest of men and materials falling from height. The safety nets shall be fire resistant, duly tested and shall be of ISI marked and the nets shall be located as per site requirements to arrest or to reduce the consequences of a possible fall of persons working at different heights.
- Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.
- Use of Rebar steel for making Jhoola and monkey-ladder (Rods welded to vertical or inclined structural members), temporary platform etc. must be avoided.
- Monkey Ladder should be properly made and fitted with cages.
- Jhoola should be made with angles and flats and tested like any lifting tools before use.
- Lanyard must be anchored always and in case of double lanyard, each should be anchored separately.
- In case of pipe-rack, persons should not walk on pipes and walk on platforms only.
- In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.
- Empty drums must not be used.
- For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor. Rope ladder should be discouraged.

11.3.11 WORKING PLATFORM

Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform gangways provided is more than 3.6 m above ground level or floor level, they shall be closely boarded and shall have adequate width which shall not be less than 750 mm and be suitably fenced as described above. Every opening in the floor or a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 90 cm.

11.3.12 EXCAVATION

Wherever there are open excavation in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

11.3.13 LADDER SAFETY

Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m in the length while the width between side rails in rung ladder shall in no case be less than app. 29.2 cm for ladder upto and including 3 m in length. For longer ladders this width shall be increased at least ¼" for each additional foot of length.

A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to Construction.

11.3.14 LIFTING SAFETY

- It will be the responsibility of the subcontractor to ensure safe lifting of the equipment, taking due precaution to avoid any incident and damage to other equipment and personnel.



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- All requisite tests and inspection of handling equipment, tools & tackle shall be periodically done by the subcontractor by engaging only the Competent Persons as per law.
- Defective equipment or uncertified shall be removed from service.
- Any equipment shall not be loaded in excess of its recommended safe working load.

11.3.15 HOISTING APPLIANCE

- Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safe guards.
- Hoisting appliance should be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming incidentally displaced.
- When workers employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided.
- The worker should not wear any rings, watches and carry keys or other materials which are good conductor of electricity.

11.4 ENVIRONMENTAL CONTROL

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

Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per Material Safety Data Sheet (MSDS).

In the event of any spillage, the principle is to recover as much material as possible before it enters drainage system and to take all possible action to prevent spilled materials from running off the site. The subcontractor shall use appropriate MSDS for clean-up technique

All subcontractors shall be responsible for the cleanliness of their own areas.

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

It is imperative on the part of the subcontractor to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social upliftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.

The subcontractor shall carry out periodic air and water quality check and illumination level checking in his area of work place and take suitable control measure.

11.5 HOUSEKEEPING

- Keeping the work area clean/ free from debris, removed scaffoldings, scraps, insulation/sheeting wastage /cut pieces, temporary structures, packing woods etc. will be in the scope of the subcontractor. Such cleanings has to be done by



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subcontractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by subcontractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the subcontractor

- Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.
- All surplus earth and debris are removed/disposed off from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. Sufficient waste bins shall be provided at
- Different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Labour camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc. shall not be allowed in the camp to obstruct free movement of men and machineries.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power line.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas

11.6 WASTE MANAGEMENT

Take suitable measures for waste management and environment related laws/legislation as a part of normal construction activities. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained.

11.6.1 BINS AT WORK PLACE

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

11.6.2 STORAGE AND COLLECTION

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

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11.6.3 SEGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.
- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

11.6.4 DISPOSAL

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

11.6.5 WARNING AND SIGNS

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

11.7 TRAFFIC MANAGEMENT SYSTEM

11.7.1 SAFE WORKPLACE TRANSPORT SYSTEM

- Traffic routes in a work place shall be suitable for the persons or vehicles using them. This shall be sufficient in number and of sufficient size. This shall reflect the suitability of traffic routes for vehicles and pedestrians.
- Where vehicles and pedestrians use the same traffic routes there shall be sufficient space between them. Where necessary all traffic routes must be suitably indicated. Pedestrians or vehicles must be able to use traffic routes without endangering those at work. There must be sufficient separation of traffic routes from doors, gates and pedestrian traffic routes.
- For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
- Temporary obstacles shall be brought to the attention of drivers by warning signs or hazard cones.
- Speed limits shall be clearly displayed. Speed ramps preceded by a warning signs or marker are necessary.
- The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions.
- Safest route shall be provided between places where vehicles have to call or deliver.
- Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse



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- Safe areas shall be provided for loading and unloading.
- Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
- Ensure road crossings are minimum and clearly signed.
- Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
- Set sensible speed limits which are clearly sign posted.
- Where necessary ramps should be used to retard speed. This shall be preceded by a warning sign or mark on the road.
- Forklift trucks shall not pass over road hump unless of a type capable of doing so.
- Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
- Road traffic signs shall be provided on prominent locations for prevention of incidents and hazards and for quick guidance and warning to employees and public. Safety signs shall be displayed as per the project working requirement and guideline of the state in which project is done. Vehicles hired or used shall not be parked within the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be approved by the person in-charge of the site.

11.7.2 TRAFFIC ROUTE FOR PEDESTRIANS

- Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.
- Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners or buildings.
- Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
- Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
- Provide high visibility clothing for people permitted in delivery area.

11.7.3 WORK VEHICLE

Work vehicle shall be as safe stable efficient and roadworthy as private vehicles on public roads. Site management shall ensure that drivers are suitably trained. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following:

- A high level of stability.
- A safe means of access/egress.
- Suitable and effective service and parking brakes.
- Windscreens with wipers and external mirrors giving optimum all round visibility.
- Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms.
- Provision of seat belts.
- Guards on dangerous parts.
- Driver protection - to prevent injury from overturning and from falling objects/materials.
- Driver protection from adverse weather.
- No vehicle shall be parked below HT/LT power lines.
- Valid Pollution Under Control certification for all vehicles



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11.7.4 DAILY CHECK BY DRIVER

- There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used.
 - Brakes.
 - Tires.
 - Steering.
 - Mirrors.
 - Windscreen waters.
 - Wipers.
 - Warning signals.
 - Specific safety system i.e. control interlocks
- Management should ensure that drivers carry out these checks.

11.7.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES

- All drivers shall hold a valid driving License for the class of vehicle to be driven and be registered as an authorized BHEL driver with the Administration Department.
- Securing of the load shall be by established and approved methods, i.e. chains with patented tightening equipment for steel/heavy loads. Sharp corners on loads shall be avoided when employing ropes for securing.
- All overhangs shall be made clearly visible and restricted to acceptable limits
- Load shall be checked before moving off and after traveling a suitable distance.
- On no account is construction site to be blocked by parked vehicles Drivers of vehicles shall only stop or park in the areas designate by the stringing foreman.
- Warning signs shall be displayed during transportation of material.
All vehicles used by BHEL shall be in worthy condition and in conformance to the Land Transport requirement.

11.7.6 MAINTENANCE

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

11.8 EMERGENCY PREPAREDNESS AND RESPONSE

- Emergency preparedness and response capability of site shall be developed as per Emergency Preparedness and Response plan issued by Regional HQ
- Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its subcontractors
- All the subcontractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Subcontractor should nominate his supervisor to coordinate and implement the safety measures.
- Assembly point shall be earmarked and access to the same from different location shall be shown
- Fire exit shall be identified and pathway shall be clear for emergency escape.



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- Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection
- Adequate number of first aid boxes shall be strategically placed at different work places to cater emergency need. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same.
- First aid center shall be developed at site with trained medical personnel and ambulance
- Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations.
- Tie up with fire brigade shall be done in case customer is not having fire station.
- Tie up with hospital shall be done in case customer is not having hospital.
- Disaster Management group shall be formed at site
- Mock drill shall be arranged at regular intervals. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats
- Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action

12.0 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements. The subcontractor shall maintain and ensure necessary safety measures as required for inspection and tests HV test, Pneumatic test, Hydraulic test, Spring test, Bend test etc. as applicable, to enable inspection agency for performing Inspection. If any test equipment is found not complying with proper safety requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.

12.1 DAILY HSE CHECKS

Both the Site Supervisors and safety officer of Subcontractor are to conduct daily site Safety inspection around work activities and premises to ensure that work methods and the sites are maintained to an acceptable standard. The following are to form the common subjects of a daily safety inspection:

- Personal Safety wears & gear compliance.
- Complying with site safety rules and permit-to-work (PTW).
- Positions and postures of workers.
- Use of tools and equipment etc. by the workers.

The inspection should be carried out just when work starts in beginning of the day, during peak activities period of the day and just before the day's work ends.

12.2 INSPECTION OF PPE

- PPEs shall be inspected by HSE officer at random once in a week as per format no. HSEP:14-F06 for its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register.
- The applicable PPEs for carrying out particular activities are listed below.



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12.3 INSPECTION OF T&Ps

- A master list of T&Ps shall be maintained by each subcontractor.
- All T&Ps being used at site shall be inspected by HSE officer once in a month as per format no. HSEP:14-F07 for its healthiness and maintenance.
- The T&Ps which require third party inspection shall be checked for its validity during inspection. The third party test certificate should be accompanied with a copy of the concerned competent person's valid qualification record.
- The validity of T&P shall be monitored as per "Status of T&Ps" format no. HSEP:14-F08

12.4 INSPECTION OF CRANES AND WINCHES

- Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
- Cranes and Winches shall be inspected by HSE officer once in a month as per format no. HSEP:14-F09 for healthiness, maintenance and validity of third party inspection.
- The date of third party inspection and next due date shall be painted on cranes and winches.
- The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card.
- The operator should be above 18 years of age and should be in possession of driving license of HMV man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list.

12.5 INSPECTION ON HEIGHT WORKING

- Inspection on height working shall be conducted daily by supervisors before start of work to ensure safe working condition including provision of
 - Fall arrestor
 - Lifelines
 - Safety nets
 - Fencing and barricading
 - Warning signage
 - Covering of opening
 - Proper scaffolding with access and egress.
 - Illumination
- Inspection on height working shall be conducted once in a week by HSE officer as per format no. HSEP:14-F10.
- Medical fitness of height worker shall be ensured.
- Height working shall not be allowed during adverse weather.

12.6 INSPECTION ON WELDING AND GAS CUTTING OPERATION

- Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
- Gas cylinders shall be kept upright.
- Use of Flash back arrestor shall be ensured at both ends.



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- Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per format no. HSEP:14-F11.
- Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
- Availability of fire extinguisher at vicinity shall be ensured.

12.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

- Ensure proper earthing in electrical installation
- Use ELCB at electrical booth
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out as per format no. HSEP:14-F12.

12.8 INSPECTION OF ELEVATOR

- Elevators shall be inspected by concerned supervisors once in a week as per format no. HSEP:14-F13.
- All elevators shall be inspected by competent person and validity shall be ensured.
- The date of third party inspection and next due date shall be painted on elevator.

12.9 INSPECTION OF EXCAVATION

Excavation activities shall be inspected as per Format HSEP:14-F13A

13.0 HSE PERFORMANCE

- Contractor shall be assessed on monthly basis for HSE Compliance by BHEL Safety In-charge at site. The HSE compliance shall be based on Online HSE Evaluation System of BHEL as per Format No. HSEP:14-F33.
- BHEL shall reserve the right to use this assessment for evaluating bidder's capacity for future tenders
- Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen by the subcontractor.
To decide HSE reward, performance towards HSE shall be evaluated for workmen and it shall be awarded regularly in public gathering.
- If safety record of the subcontractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the subcontractor may be considered by BHEL after completion of the job.

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14.0 HSE PENALTIES

- As per contractual provision HSE penalties shall be imposed on subcontractors for non-compliance on HSE requirement as per format no. HSEP:14-F14. The list in the format is only indicative. For any other violation, not listed in the format, the minimum penalty amount is to be decided as per BOCW act.
- If principal customer/statutory and regulatory bodies impose some penalty on HSE due to the non-compliance of the subcontractor the same shall be passed on to them.
- The penalty amount shall be recovered by Site Finance department from subcontractors from the RA/Final bill.

15.0 OTHER REQUIREMENTS

- In case of any delay in completion of a job due to mishaps attributable to lapses by the subcontractor, BHEL shall have the right to recover cost of such delay from the payments due to the subcontractor, after notifying the subcontractor suitably.
- If the subcontractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instruction regarding safety issued by BHEL, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL.
- If the subcontractor succeeds in carrying out its job in time without any fatal or disabling injury incident and without any damage to property BHEL may, at its sole discretion, favorably consider to reward the subcontractor suitably for the performance.
- In case of any damage to property due to lapses by the subcontractor, BHEL shall have the right to recover the cost of such damages from the subcontractor after holding an appropriate enquiry.
- The subcontractor shall take all measures at the sites of the work to protect all persons from incidents and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any persons for injury sustained or death owing to neglect of the above precautions and to pay any such persons such compensation or which may with the consent of the subcontractor be paid to compromise any claim by any such person, should such claim proceeding be filed against BHEL, the subcontractor hereby agrees to indemnify BHEL against the same.
- The subcontractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.
- The subcontractor shall notify BHEL of his intention to bring to site any equipment or material which may create hazard.
- BHEL shall have the right to prescribe the conditions under which such equipment or materials may be handled and the subcontractor shall adhere to such instructions.



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- BHEL may prohibit the use of any construction machinery, which according to the organization is unsafe. No claim for compensation due to such prohibition will be entertained by BHEL.

16. NON COMPLIANCE

NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND BHEL HAS RIGHT TO IMPOSE FINES ON THE SUBCONTRACTOR AS UNDER FOR EVERY INSTANCE OF VIOLATION NOTICED:

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03	Not wearing safety shoe	200/-*
04	Not keeping gas cylinders vertically	200/-
05	Not using flash back arrestors	100/-
06	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slings properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

• Legend:-

*: per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the subcontractor. The amount collected above will be utilized for giving award to the employees who could avoid incident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.



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17.0 HSE AUDIT/INSPECTION

- Regular HSE Audit/inspection shall be carried out by Subcontractor as per Site HSE audit calendar.
- HSE checklist (**Annexure 02**) shall be used for carrying out audit/inspection and report shall be submitted to BHEL site management
- All non-conformities and observations on HSE identified during internal or external HSE audit shall be disposed off by site in a time bound manner and reported back the implementation status
- Corrective action and Preventive action on HSE issues raised by certification body issued by Regional HQs shall be implemented by site and reported to Site management.

18.0 MONTHLY HSE REVIEW MEETING

- ☐ Site shall hold HSE review meeting every month to discuss and resolve HSE issues of site and improve HSE performance. It will also discuss the incidents occurred since previous meeting, its root cause and Corrective action and Preventive action. The agenda is given below:
 - Implementation of earlier MOM
 - HSE performance
 - HSE inspection
 - HSE audit and CAPA
 - HSE training
 - Health check-up camp
 - HSE planning for the erection and commissioning and installation activities in the coming month
 - HSE reward and promotional activities
- ☐ The meeting shall be chaired by Construction Manager, convened by HSE coordinator and attended by all HOS, Site Incharge of Subcontractors and HSE officer of Subcontractors.
- ☐ MOM on the discussion will be circulated to the concerned for implementation.

19.0 FORMATS USED (Details available in Annexure-04)

SL. No.	Format Name	Format No.	Rev No.
01	Inspection of First Aid Box	HSEP:14-F01	00
02	Health Check Up	HSEP:14-F02	00
03	HSE Induction Training	HSEP:14-F03	00
04	Tool Box Talk	HSEP:14-F04	00
05	Monthly Site HSE Report	As specified by BHEL	00
06	Inspection of PPE	HSEP:14-F06	00



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07	Inspection of T&Ps	HSEP:14-F07	00
08	Status of T&Ps	HSEP:14-F08	00
09	Inspection of Cranes and Winches	HSEP:14-F09	00
10	Inspection on Height Working	HSEP:14-F10	00
11	Inspection on Welding & Gas Cutting	HSEP:14-F11	00
12	Inspection on Electrical Installation	HSEP:14-F12	00
13	Inspection on Elevator	HSEP:14-F13	00
14	HSE Penalty	HSEP:14-F14	00
15	Accident /incident / property damage /fire incident report	HSEP:14-F15	00



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20.0 ANNEXURES

ANNEXURE 01

As per Contract Labour (Regulation & Abolition Act), Central Rules, 1971,

- (1) The first-aid box shall be distinctively marked with a Red Cross on a white background and shall contain the following items, namely:

(a) For establishments in which the number of contract labour employed does not exceed fifty, each first aid box shall contain the following equipment:

(i)	6 small sterilized dressings
(ii)	3 medium size sterilized dressings
(iii)	3 large size sterilized dressings
(iv)	6 pieces of sterilized eye pads in separate sealed packets.
(v)	6 roller bandages 10 cm wide.
(vi)	6 roller bandages 5 cm wide.
(vii)	One tourniquet
(viii)	A supply of suitable splints
(ix)	Three packets of safety pins.
(x)	Kidney tray.
(xi)	3 large sterilized burn dressings.
(xii)	1 (30ml) bottle containing a two percent alcoholic solution of iodine
(xiii)	1 (30 ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label
(xiv)	1 snake bite lancet
(xv)	1 (30gms) bottle of potassium permanganate crystals.
(xvi)	1 pair scissors
(xvii)	1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
(xviii)	A bottle containing 100 tablets (each of 5 grains) of aspirin
(xix)	Ointment for burns
(xx)	A bottle of suitable surgical anti-septic solution

(b) For establishment in which the number of contract labour exceeds fifty each first-aid box shall contain the following equipment:

(i)	12 small sterilized dressings
(ii)	6 medium size sterilized dressings
(iii)	6 large size sterilized dressings.
(iv)	6 large size sterilized burn dressings
(v)	6 (15 grams) packets sterilized cotton wool
(vi)	12 pieces of sterilized eye pads in separate sealed packets.



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(vii)	12 roller bandages 10 cm wide.
(viii)	12 roller bandages 5 cm wide.
(ix)	One tourniquet.
(x)	A supply of suitable splints.
(xi)	Three packets of safety pins.
(xii)	Kidney tray.
(xiii)	Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.
(xiv)	4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.
(xv)	1 (60ml) bottle containing a two percent alcoholic solution of iodine
(xvi)	One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water.
(xvii)	1 (120ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label.
(xviii)	1 roll of adhesive plaster (6 cmX1 meter)
(xix)	2 rolls of adhesive plaster (2 cmX1 meter)
(xx)	A snake bite lancet.
(xxi)	1 (30 grams) bottle of potassium permanganate crystals.
(xxii)	1 pair scissors
(xxiii)	1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India.
(xxiv)	a bottle containing 100 tablets (each of 5 grains) of aspirin
(xxv)	Ointment for burns
(xxvi)	A bottle of a suitable surgical anti septic solution.

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



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ANNEXURE 02

HSE AUDIT/INSPECTION CHECKLIST CUM COMPLIANCE REPORT

PROJECT: _____

SUBCONTRACTOR: _____

DATE : _____

OWNER : _____

INSPECTION BY: _____

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

Item	Y e s	N o	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNEL PROTECTIVE EQUIPMENTS				
Goggles; shields				
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				



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Angle + 70° from horizontal				
Other				
HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaf OK				
Condition of slings, chains, hooks OK				
Inspection & maintenance log maintained				
Outriggers used				
Signals observed and understood				
Qualified operators				
Others				
MACHINERY, TOOLS & EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
General neatness				
Others				
FIRE PREVENTION				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas.				
Hydrants				
Clearance				
Others				
ELECTRICAL				
Proper wiring				
ELCB's provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Other				
HANDLING & STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				



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Other				
WORKING AT HEIGHT				
Safety nets				
Safety belts				
Safety helmets				
Anchoring of safety belt to the life line rope				
ENVIRONMENT				
Lubricant waste/engine oils properly dispose.				
Waste from Canteen, offices, sanitation etc. disposed properly.				
Disposal of surplus earth, stripping materials, expired batteries, oily rags and combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.				
Availability of first-aid facilities				
Proper sanitation at site, office & labor camps.				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				
Provision of crèches for children.				



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ANNEXURE 03

REFERENCES

- Contract documents
- Relevant legislations
- HSEMSM
- Relevant Indian standards as listed below (illustrative only):

SL NO	CODE NAME	TITLE
(1)	IS : 818-1888 (Reaffirmed 2003)	Code of Practice for safety and health requirements in Electric and Gas Welding and Cutting operations.
(2)	IS: 1179-1967 (Reaffirmed 2003)	Specification for Equipment for Eye & Face protection during welding.
(3)	IS : 1989 (Part 2):1986 (Reaffirmed 1997)	Specification for Leather Safety Boots & Shoes
(4)	IS:2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
(5)	IS:3521 : 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
(6)	IS:3646(Part II) – 1966 (Reaffirmed 2003)	Code of Practice for Interior Illumination
(7)	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders
(8)	IS: 3696(Part 2) : 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
(9)	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Incidents
(10)	IS:4770 : 1991 (Reaffirmed 2006)	Rubber Gloves – Electricals purposes-Specification
(11)	IS:4912 : 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
(12)	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
(13)	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
(14)	IS:9167:1979	Specification for Ear-Protectors
(15)	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
(16)	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
(17)	IS 11006 : 2011	Flash Back(Flame Arrestor) Specification



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(18)	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
(19)	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect against Particles-Specification.
(20)	IS:9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings-Recommendations on Safe working loads.
(21)	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
(22)	IS:12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots-Specification
(23)	IS:13367(Part 1):1992 (Reaffirmed 2003)	Safe Use of Cranes-Code of Practice
(24)	IS:14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
(25)	IS:14746 : 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
(26)	IS : 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type(Stored Pressure)-Specification
(27)	IS: 19011:2002	Guidelines for Quality and/or Environmental Management Systems Auditing



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**ANNEXURE 04 : SAFETY FORMATS
&
ANNEXURE 05 : WORK PERMIT FORMATS**

**POWER SECTOR****INSPECTION OF FIRST AID BOX**

FORMAT NO: HSEP:14-F01

REV NO.: 00

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Number of employees on the site: - _____

Sl.No.	Item	No. Available	Remarks
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of large sized sterilized burn dressings		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of Suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available.		
14	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
15	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
16	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		

**POWER SECTOR****INSPECTION OF FIRST AID BOX**

FORMAT NO: HSEP:14-F01

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Sl.No.	Item	No. Available	Remarks
17	Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label, available.		
18	Whether roll of adhesive plaster (6 cmX1 meter) available		
19	No of rolls of adhesive plaster (2 cmX1 meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium permanganate crystals available.		
22	Whether a pair scissors available		
23	Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India available.		
24	Whether bottle containing 100 tablets (each of 5 grains) of aspirin available		
25	Whether Ointment for burns available		
26	Whether bottle of a suitable surgical anti-septic solution available		

Signature of Subcontractor's Site I/C:

**POWER SECTOR****HEALTH CHECK UP**

FORMAT NO: HSEP:14-F02

REV NO.: 00

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Name of Site :	
Name of Sub-Contractor :	
Name of Employee :	

NAME:

History Of Past Illness	H/O Epilepsy
	H/O Drug Allergy
	H/O Diabetics/ Hypertension
	H/O Unconsciousness
Personal History	
EXAMINATION	
OBSERVATION	
<u>General Physical Examination</u>	
Height	:
Weight	:
BMI	:
Built And nourishment	:
Pallor	:
Temperature	:
Chest Expansion	: Inspiration Expansion
Lymph Node Enlargement	:
<u>Ear, Nose, Throat</u>	:
Ear	:
Nose	:
Throat	:

**POWER SECTOR****HEALTH CHECK UP**

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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

**POWER SECTOR****HSE INDUCTION TRAINING**

FORMAT NO: HSEP:14-F03

REV NO.: 00

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Name of Site :	
Name of Sub-Contractor :	
Date :	
Name of Training Co-ordinator	

Sl No.	Name	Designation	Organisation	Signature

Signature of Training co-ordinator :

	POWER SECTOR	FORMAT NO: HSEP:14-F04 REV NO.: 00 PAGE NO. 01 OF 01
	TOOL-BOX TALK	

Name of Site :	
Sub-Contractors Name :	
Date :	

Topic	Name of person delivered Tool Box Talk	No. of Participants attended	Remarks

Signature of Site I/C of Subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F06 REV NO.: 00 PAGE NO. 01 OF 01
	PERSONAL PROTECTIVE EQUIPMENTS	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at site
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Other PPEs.			

Signature of Site I/C of Subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F07 REV NO.: 00 PAGE NO. 01 OF 01
	INSPECTION OF T&Ps	

Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Sl.No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs / overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	

Signature-Site Safety Officer (BHEL)	Signature-Subcontractor/ Subcontractor's Safety Officer

	POWER SECTOR	FORMAT NO: HSEP:14-F08 REV NO.: 00 PAGE NO. 01 OF 01
	STATUS OF T&Ps	

Name of Site	
Name of Sub-Contractor	
Date of Inspection	

Item	Nos. Deployed	Identification No.	Nos. Tested by competent person	Validity of Test Certificate
Winches				
Chain Blocks				
Wire Rope Slings				
Man Cages				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of Site I/C of subcontractor:

**POWER SECTOR****INSPECTION OF CRANES AND WINCHES**

FORMAT NO: HSEP:14-F09

REV NO.: 00

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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		

**POWER SECTOR****INSPECTION OF CRANES AND WINCHES**

FORMAT NO: HSEP:14-F09

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Sl.no.	Description	Observation	Measures
22	Guards of moving and rotating parts		
23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

WINCH

Sl. No.	Description	YES	NO	NA	Remarks
1	Has the copy of Third Party Inspection certificate been provided in winch machine shed?				
2	Is winch machine operator experienced enough to operate the winch machine?				
3	Is the winch machine operated by someone other than the winch machine operator?				
4	Is there guard provided in all moving parts like wheel and motor's shaft?				
5	Will it protect against unforeseen operational contingencies?				
6	Are brakes, clutch and locking arrangement working properly?				
7	Has it been ensured that the guard does not constitute a hazard by itself?				
8	Are the cranks and the connecting rods protected by guardrails?				
9	Is there provision for fully covered shed with wooden plank roof?				

**POWER SECTOR****INSPECTION OF CRANES AND WINCHES**

FORMAT NO: HSEP:14-F09

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Sl. No.	Description	YES	NO	NA	Remarks
10	Is wire rope free from any kind of damage or wear and tear?				
11	Is split pin provided for the protection of clutch and brake locking arrangement?				
12	Is pulley inspected by competent person and certified before use?				
13	Is pulley free from any wear and tear visually?				
14	Is winch rope barricaded with clipsheet for the protection of rope and person?				
15	Is the wire rope lubricated by cardium oil?				
16	Is there any friction in wire rope which may damage the wire rope rather than the rolling parts?				
17	Is there any oil leakage in the hydraulic system of the winch machine?				
18	Has it been ensured that the guard will not cause discomfort or inconvenience to operator?				
	Total Number of NO:				
	Total Number of NA:				
	% Compliance :				

Signature of Site I/C of subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F10 REV NO.: 00 PAGE NO. 01 OF 02
	INSPECTION OF HEIGHT WORKING	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
1	All the workers have been explained safe work method?		
2	An established communication system has been established and explained to the workers.		
3	Adequate illumination has been ensured.		
4	Work area inspected prior to the start of the work.		
5	Area below the work place barricaded, particularly below hot work.		
6	Workers provided with bags /box to carry bolts, nuts and hand tools		
7	Arrangement for fastening hand tools made.		
8	All work platforms ensured to be of adequate strength and ergonomically suitable.		
9	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.		
10.	Work at more than one elevation at the same segment is restricted.		
	ACCESS/EGRESS		
1	Walkways provided with handrail, mid-rail and toe guard?		
2	All checkered plates, gratings properly welded/ bolted?		
3	Are ladders inspected and they are in good condition?		
4	Are ladders spliced?		
5	Are ladders properly secured to prevent slipping, sliding or falling?		
6	Do side rails extend 36" above top landing?		
7	Are built up ladders constructed of sound materials?		

**POWER SECTOR****INSPECTION OF HEIGHT WORKING**

FORMAT NO: HSEP:14-F10

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Sl. No.	Descriptions	Observation (Yes/No)	Remarks
8	Are rugs and cleats not over 12" on center?		
9	Metal ladders not used around electrical hazards.		
10	Proper maintenance and storage.		
11	Ladders placed at right slope.		
12	Ladders / staircases welded/ bolted properly.		
13	Any obstruction in the stairs.		
14	Are landing provided with handrails, knee rails, toe boards etc.?		
15	Whether ramp is provided with proper slope.		
16	Proper hand rails / guards provided in ramps.		
	Housekeeping		
1	Walkways, aisles & all overhead workplaces cleared of loose material.		
2	Flammable materials, if any, are cleared.		
3	All the de shuttering materials are removed after de shuttering is done.		
4	Platforms and walkways free from oil/grease or other slippery material.		
5	Collected scrap are brought down or lowered down and not dropped from height.		
	PPE And Safety Devices		
1	Use of safety helmet, safety belts ensured for all workers		
2	Anchoring points provided at all places of work.		
3	Common lifeline provided wherever linear movement at height is required.		
4	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical workplaces.		
6	Crawler boards/Safety system or works on fragile roof are used.		

Signature of Site I/C of subcontractor :

**POWER SECTOR****INSPECTION OF WELDING AND GAS
CUTTING**

FORMAT NO: HSEP:14-F11
REV NO.: 00
PAGE NO. 1 OF 02

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection	

Welding				
Sl.no.	Description	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 lugged & tight properly?			
11	Are return lead connected properly (Rod, Angle, Channels shall not be used)			
	Total No of NO			
	Total No of YES			

**POWER SECTOR****INSPECTION OF WELDING AND GAS
CUTTING**

FORMAT NO: HSEP:14-F11
REV NO.: 00
PAGE NO. 2 OF 02

Gas Cutting				
Sl. no	Description	Yes	No	Remarks
1	Are Cylinders kept on trolleys?			
2	Physical condition of Gas cylinders Good?			
3	Is there Oil/Grease on valve of the cylinder?			
4	Are pressure regulators in good condition?			
5	Condition of hose pipe OK?			
6	Are hose pipe clamped with hose clip?			
7	Is flash back arrestor & NRV fitted on torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F12 REV NO.: 00 PAGE NO. 01 OF 02
	INSPECTION OF ELECTRICAL INSTALLATION	

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:14-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 :

	POWER SECTOR	FORMAT NO: HSEP:14-F13 REV NO.: 00 PAGE NO. 01 OF 01
	INSPECTION OF ELEVATOR	

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	FORMAT NO: HSEP:14-F13E REV NO.: 00 PAGE NO. 01 OF 01
	Inspection of Excavation	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sl.no.	Description	Yes	No	Remarks
1	Precautions taken for Underground Electrical Cable			
2	Precautions taken for Under / Above ground sewer/ Drinking Water Line			
3	Precautions taken for Underground Telecommunication Line			
4	Precautions taken for Underground Product/Utility Line			
5	Precautions taken for Underground Fire Water Line			
6	Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times			
7	Slope Cutting / Angle Maintained			
8	Hard Barricading & Edge Protection provided			
9	Separate Safe Access for Man and Vehicle			
10	Lighting arrangement			
11	Banksman Provided			
12	Required basic PPEs provided			
13	Excavated soil / Construction Material / equipment kept away from the edge.			
14	First aid in attendance.			
15	Other:			
	Total No of YES			

Signature-Subcontractor/ Subcontractor's Safety Officer

Signature-Site Safety Officer (BHEL)

**POWER SECTOR****HSE PENALTY**

FORMAT NO: HSEP:14-F14

REV NO.: 00

PAGE NO. 1 OF 02

Sub: MEMO for Penalty for non-compliances in Safety

Following lapse (tick marked) was observed and penalty is imposed as stated at the bottom of this memo. It is requested that such occurrences be please avoided in future.

Safety Area

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03	Not wearing safety shoe	200/-*
04	Not keeping gas cylinders vertically	200/-
05	Not using flash back arrestors	100/-
06	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slings properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

Legend: -

*: per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

1 Copy to Site Construction Manager (BHEL)

	POWER SECTOR- HQ	FORMAT NO: HSEP:14-F15 REV NO.: 00 PAGE NO. 01 OF 01
	Incident Report (To be submitted within 24 hours of time of incident)	

Type of incident: Fatal/Major/ Minor/Fire/Property Damage/Near-miss

1	NAME OF SITE		3	ACTIVITY AREA	
2	SCOPE OF WORK		4	NAME OF CONTRACTOR	
			5	NAME & DESIGNATION OF BHEL ACTIVITY I/C	
6	DATE & TIME OF ACCIDENT		7	DATE RESUMED	
8	NO. OF WORK-DAYS LOST BY VICTIM (If duty not resumed, give estimated figure)				
9	NO. OF MANHOURS LOST BY OTHERS				
10	PERSONAL DETAILS OF INJURED AND / OR DETAILS OF MATERIALS / EQUIPMENT / PROPERTY DAMAGED				
NAME			NAME OF MATERIAL / EQUIPMENT / PROPERTY		
PERIOD OF EMPLOYMENT					
AGE	YRS	SEX	MALE/ FEMALE	ESTIMATED COST	ACTUAL COST
MARITAL STATUS		SINGLE / MARRIED			
OCCUPATION		NATURE OF DAMAGE			
PART OF BODY INJURED					
NATURE OF INJURY					
AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) MOST RESPONSIBLE FOR CAUSING ACCIDENT / INJURY / DAMAGE					
12	PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) CAUSING ACCIDENT INJURY / DAMAGE				
13	DESCRIBE CLEARLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET, IF REQUIRED)				
ANALYSIS					
14	WHAT ACTS AND / OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS ACCIDENT				
15	WHAT ARE THE BASIC REASON FOR THE EXISTENCE OF THESE ACTS AND / OR CONDITION ?				
16	WHAT CORRECTIVE ACTIONS HAVE BEEN TAKEN TO PREVENT ACCIDENT RECURRENCE ?				
	DATE :		SIGNATURE OF SITE HSE COORDINATOR		
17	COMMENTS OF HEAD / SOX				
	DATE:		SIGNATURE OF HEAD/SOX		

	POWER SECTOR	FORMAT NO: HSEP:14-F30 REV NO.: 00 PAGE NO. 01 OF 3
	Format for Monthly HSE Planning & Review	

Note: This is a template and can be modified in consultation with BHEL			
Name of the Site		Name of the Subcontractor	
Scope of Work		Date	
PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF.....			PART-B: REVIEW ON
SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
1	Availability of First Aid Box at Required Places and Inspection thereof as per Format: Fo1	Areas 1.	
2	Health check-up as per Format: Fo2	Health check-up for Nos 1. New inductees 2. Drivers & Operators 3. Workers in following high risk areas: a. ...	
3	Induction training of newly joined workers as per Format: Fo3	Minimum No. of workers:	
4	Toolbox talks (TBT) conducted before start of work as per Format: Fo4	Locations of TBTs & No. of workers 1. ...	
5	PPE usage and issue as per Format: Fo6		
6	Inspection of T&Ps as per Format: Fo7	List of T&Ps to be inspected 1.	
7	Identification & Inspection Status of T&Ps as per Format: Fo8		
8	Inspection of Cranes & Winches as per Format: Fo9	List of Cranes & Winches & Nos. 1. ...	
9	Inspection of Height Working as per Format: F10	Areas: 1. ...	
10	Inspection of Welding & Gas Cutting operations as per Format: F11	Areas: 1. ...	
11	Inspection of Electrical Installations as per Format: F12	Locations: 1. ...	
12	Inspection of Elevators (as applicable) as per Format: F13	Locations: 1. ...	
13	Inspection of Excavation as per Format: F13E	Locations: 1. ...	



POWER SECTOR

Format for Monthly HSE Planning & Review

FORMAT NO: HSEP:14-F30

REV NO.: 00

PAGE NO. 02 OF 3

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
14	Job Safety Analysis as per Format F32B	Activities: 1. ...	
15	Regular Job Specific Training (Re-training) for workers involved in hazardous activities	Topics/ Hazards & No. of workers 1. ...	
16	Mass housekeeping (HK) drive in work areas	Areas 1. ...	
17	Vertigo Test of Height workers	Minimum No. of workers:	
18	Deployment of qualified HSE Officers as per contract	Location(s) & Nos. 1. ...	
19	Deployment of qualified HSE Stewards as per contract	Location(s) & Nos. 1. ...	
20	Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.)	Tool/ Equipment & Location 1. ...	
21	Safety Walks by site in charge of agency (4 -Weekly once)	Dates:	
22	Safety walks by departmental head (8-Weekly twice)	Dates:	
23	Availability/ deployment of Safety posters/ placards/ signage at strategic locations	Locations: Nos. 1. ...	
24	Provision of clean drinking water sources for workers	Locations: Nos. 1. ...	
25	Provision of toilets for workers (separate for male & female workers)	Locations: Nos. 1. ...	
26	Rest sheds for workers during lunchtime, rain, dust storm etc.	Locations: Nos. 1. ...	
27	Availability of following in Labor colony	1. Clean drinking water 2. Toilets 3. Cleanliness & Hygiene 4. Grass cutting, 5. Fogging 6. Electrical Inspection ...	

	POWER SECTOR		FORMAT NO: HSEP:14-F30 REV NO.: 00 PAGE NO. 03 OF 3
	Format for Monthly HSE Planning & Review		
SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
28	Availability of dust/ waste bins at various locations	Locations: 1. ...	
29	Availability of Ambulance (individual/ joint) in each shift	Ambulance No.	
30	Availability of emergency vehicle in each shift	Emergency vehicle	
31	Deployment/ Availability of tested Fire Extinguishers	Locations & Nos. 1. ...	
32	Tree plantation	Locations & Nos. 1. ...	
33	Waste disposal & Scrap Bins	Locations 1. ...	
34	Illumination checks	Locations 1. ...	
35	Safety award function: 1. Display of good practices Award presentation	Minimum 1 per month	
36	Submission of Daily Reports as per Format No.F31A	Daily Reports (Night & Day Shifts)	

PLAN		REVIEW	
<u>Agency</u> Name:	<u>BHEL</u> Name:	<u>Agency</u> Name:	<u>BHEL</u> Name:
Sign:	Sign:	Sign:	Sign:
Date:	Date:	Date:	Date:



	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

Night		Day	SHIFT	Year	Site
			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		
NA			T&P Inspection (Names & Nos. Inspected)		
			Safety Walk (Designation, Areas)		
NA			HSE Meeting		
NA			Safety Reward (Details)		
NA			Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/Details)		
			Lost time Accident		
			Restricted Work Case		
			Medical Treatment Case		
			First Aid Case		
			Near miss		
			Property Damage/ Fire		
			Non-Compliances Submitted by BHEL		
			Complied by Agency		
			Any other Remarks/ Inputs		



POWER SECTOR

Job Safety Analysis Format

FORMAT NO: HSEP:14-F32B

REV NO.: 00

PAGE NO. 01 OF 1

Name of the Site	
Name of the Subcontractor	
Activity, Area	

HAZARDS				PRECAUTIONS	

(Name)	Submitted By (Agency HSE)		Reviewed By (BHEL Execution)		Approved By (BHEL HSE)	
(Sign)						
(Date)						

**POWER SECTOR- HQ**

FORMAT NO: HSEP:14-F33

REV NO.: 00

PAGE NO. 01 OF 3

Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	M	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	M	1	Toolbox Talk Records
1c	Contractor in charge and safety in charge attended safety meetings?	M	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	M	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	M	1	Report submission date
1f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	M	1	Incident/ Near Miss Records
1g	Carrying out Inspections and submission of Inspection reports within stipulated time	M	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	M	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	M	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	M	2	Safety Officer qualification & experience records
2c	Availability of Qualified safety supervisor (1 for every 100 labour)	M	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	M	2	PPE Issue Records, Inspection/ non-conformity records
2e	Housekeeping done on regular basis and scrap removal at site	M	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2l	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
2l.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
2l.3	Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks		1	Master T&P List with internal & external test details
2l.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators. Mixers etc.		1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details
2l.6	Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.		1	Master T&P List with internal & external test details
2l.7	Availability of Tags & Inspection Certificates for Batching plants		1	Master T&P List with internal & external test details

**POWER SECTOR- HQ**

FORMAT NO: HSEP:14-F33

REV NO.: 00

PAGE NO. 02 OF 3

Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
2m.1	Use of Lifting Permit as per requirement		1	Permit Records
2m.2	Use of Height Permit as per requirement		1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		1	Permit Records
2m.4	Use of Excavation permit as per requirement		1	Permit Records
2m.5	Use of Confined space work permit as per requirement		1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		1	Permit Records
2m.7	Use of Lockout-Tag out permit as per requirement		1	Permit Records
2m.8	Use of Radiography permit as per requirement		1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		1	Inspection/ non-conformity records
3b	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	M	1	
3d	Availability of rest rooms for workers at site	M	1	
3e	Availability of Drinking water facility at work spot		1	
3f	Hygienic Labour colony is provided for workers.		1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		1	Work Permit records
4b	Whether area below lifting activities barricaded		1	Inspection/ non-conformity records
4c	Availability of experienced rigging foreman		1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		1	
5a	Whether all deep excavation has been protected by barrier		1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		1	-do-
5c	Proper access and egress provided for excavations?		1	-do-
5d	Blasting is done in controlled manner?		2	-do-
6a	Whether Electrical booth is equipped with Co ₂ fire extinguishers and fire buckets filled with sand?		2	Inspection/ non-conformity records
6b	Availability of Illumination lamp in electric booth?		1	-do-
6c	whether Caution Boards have been displayed?		1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		1	-do-
6e	Usage of Insulated welding cables.		1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		1	-do-
6g	Availability of functional & individual 30mA ELCB / RCCB and MCB for protection and conducting periodical check-up?		1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		1	-do-
6i	Whether Electrician is qualified and experienced		1	Qualification & Experience records of electrician
6j	Availability and usage of Rubber hand gloves by electrician?		1	Inspection/ non-conformity records

	POWER SECTOR- HQ	FORMAT NO: HSEP:14-F33
	Checklist for Evaluation of HSE Performance	REV NO.: 00 PAGE NO. 03 OF 3

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
7a	Whether Scaffolding pipes made with steel or aluminum, are being used and checked periodically by experienced/ certified scaffolder?		2	Inspection/ non-conformity records
7b	8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work?		2	-do-
7c	Availability of emergency lighting in case of power failure		1	-do-
7d	Whether all the openings are covered with Safety Nets made of fire proof Nylon?		1	-do-
7e	Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard ?		1	-do-
7f	Whether Ladder with vertical life line /Fall arrestor is available to climb?		1	-do-
7g	Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test?		1	Height Pass records
7h	Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt?		1	PPE Issue records, inspection/ non-conformity reports
7i	Is all hand tools/Small material used by height workers is tied firmly to prevent fall?		1	-do-
8a	Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side		1	Inspection/ non-conformity records
8b	Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately?		1	-do-
8c	Availability of Face screen, Hand gloves, and Apron, for welders		1	-do-
8d	Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas		1	-do-
9a	Pre-employment medical check-up done for all workers and submitted?		1	Medical check records
9b	Availability of first aid center, with MBBS doctor(Own or Sharing basis)	M	2	Attendance records
9c	Availability of Ambulance facility 24 hours (Own or sharing basis)	M	2	-do-
9d	Is First aid trained personnel's are available and their names are displayed at site?	M	1	-do-
9e	Availability of Emergency vehicle at site		1	
9f	Periodical medical check-up is conducted for all the workers and submitted?		1	Medical check records
9g	Availability of sufficient number of first aid box as per standard list and maintaining record		1	Inspection records
10a	Availability of Fire extinguishers, buckets at all vulnerable points		2	Fire extinguisher records
10b	Periodic fire mock drill conducted?		1	Fire, Mock drill records
10c	Are all flammable materials are stored separately?		1	
10d	Periodic grass cutting is done in material storage area?		1	
10e	Availability of 24V DC lighting in confined space work area		1	
10f	Availability of exhaust fan in confined space work area		1	

Note:

- **M: Mandatory; O: Optional.** Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL
- Additionally: 30 Marks for each Fatal Accident and 10 mark for each major accident shall be deducted.



SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

Subcontractor: _____

BURNING/WELDING /HOT WORK PERMIT

Area : _____ Date: _____ Time: _____

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

Name of Work Performing Contractor: _____

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

Description of Work: _____

Work Execution Date: _____ Time Valid from: _____ to _____

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

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	Proper Access/Exit available		
2.	Proper ventilation and /or lighting provided.		
3.	Proper and safe scaffolding, platform, ladder provided.		
4.	Welding machine located in a clean and dry area.		
5.	Welding machine grounded at the equipment and proper leakage current protection device (ELCB) provided for welding machine.		
6.	Emergency STOP buttons are in working condition. Welder /Helper knows how to operate it.		
7.	Welding machine input/output cables, welding holder and weld return clamp (Holder) are insulated and in good condition.		
8.	Welder & Fitter trained to connect ground/work return clamps (Holder) to work place prior to energization of welding machine.		
9.	Gas cylinders are stacked vertically and not below the welding / cutting area. Regulator key is available with cylinder.		
10.	Pressure gauges/Flash back arrestor provided and in working condition.		
11.	Personal Protective equipment Minimum applicable: safety helmet, safety goggles, welding helmet, safety shoes, leather gloves, long sleeve and nose mask -provided		
12.	In case of pits, water removed from the pit and wood/rubber insulation provided.		
13.	Safety signboards are in place.		
14.	Adequate and Suitable nos. of fire fighting extinguisher provided.		
15.	Nearby combustible material removed. Housekeeping done.		
16.	Other		

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

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

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

Name of BHEL Safety Representative: _____ Sign: _____

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

Name of Work Performing Authority: _____ **Sign:** _____ **Date:** _____ **Time:** _____**Permit Cancellation:**

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

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

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

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

(This permit is valid only for the date it is issued)

Original at BHEL site

Second Copy – BHEL SAFETY

Third Copy : Contractor



SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

Subcontractor: _____

LIFTING ACTIVITY PERMIT

Area : _____ Date: _____ Time: _____

Name of Site Engineer (Permit Requesting Authority): _____ Sign: _____ Name of Work

Performing Contractor: _____

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

Description of Work: _____

Work Execution Date: _____ Time Valid from: _____ to _____

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

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	Crane used for lifting activity tested, certified and approved for rated lifting		
2.	All lifting tackles, gears/appliances are tested and certified for lifting works.		
3.	Crane operator is trained and competent for lifting operation.		
4.	Lifting sling/ belt is protected against sharp edge of the jobs to be lifted.		
5.	Access and exit marked and without obstruction.		
6.	Lifting arrangement adequate.		
7.	Unwanted rubbish material removed from work platform.		
8.	Minimum 2 guidelines have been provided for balancing and guiding jobs to be lifted.		
9.	Periphery area of crane booms as well as lifting job is barricaded and unauthorized/no-entry sign board posted.		
10.	Rigger and signal man is trained and competent for lifting work.		
11.	No lifting activity to be carried out during lightening, heavy wind/rain.		
12.	If scaffolding to be used during lift, scaffolding with valid tag available for use.		
13.	Double lanyards safety harness/belt checked and in working condition.		
14.	Safety shoes (non-slip), helmet with chin strap available with employees.		
15.	Others.		

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

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

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

Name of BHEL Safety Representative: _____ Sign: _____

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

Name of Work Performing Authority: _____ **Sign:** _____ **Date:** _____ **Time:** _____**Permit Cancellation:**

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

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

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

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

(This permit is valid only for the date it is issued)

Original at BHEL site**Second Copy – BHEL SAFETY****Third Copy : Contractor**



SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

Subcontractor: _____

WORKING AT HEIGHT PERMIT

Area : _____ Date: _____ Time: _____

Name of Site Engineer (Permit Requesting Authority): _____ Sign: _____ Name of Work

Performing Contractor: _____

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

Description of Work: _____

Work Execution Date: _____ Time Valid from: _____ to _____

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

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	All workers on job are medically fit for working at height (Person should not have vertigo)		
2.	Scaffolding with valid tag available for use		
3.	Safety harness with life line support/ fall arrester are checked and in working condition		
4.	Safety shoes (non-slip), Helmet with chin strip available with employees		
5.	Safety nets are provided as per design and provided 25 ft. below working area & extending 8 ft beyond.		
6.	Horizontal life lines are provided to cater to design specification of 2300kg per person.		
7.	Ladders have been inspected and provided as per BHEL standard/contract.		
8.	All lifting / tightening tools, hand tools/equipment checked and in good condition		
9.	Access and exit marked and without obstruction.		
10.	Lighting arrangement adequate.		
11.	Unwanted and rubbish material removed from working platform.		
12.	Electrical cable, welding Hose/Compressed air hose properly secured and lay down without obstruction.		
13.	Signboards provided on working platforms		
14.	Hazards in the vicinity are identified and communicated to the worker.		
15.	Other		

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

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

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

Name of BHEL Safety Representative: _____ Sign: _____

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

Name of Work Performing Authority: _____ **Sign:** _____ **Date:** _____ **Time:** _____**Permit Cancellation:**

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

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

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

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

(This permit is valid only for the date it is issued)

Original at BHEL site**Second Copy – BHEL SAFETY****Third Copy : Contractor**



General Conditions of Contract

(Common for Power Sector Regions)

2012

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CHAPTER -1

1. GENERAL INSTRUCTION TO TENDERERS

1.1. DESPATCH INSTRUCTION

- i) The General Conditions of Contract form part of the Tender specifications. **All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof.** The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages
- ii) Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., he shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.
- iii) Integrity pact (IP) shall be applicable for all tenders / contracts if indicated in NIT. This integrity pact shall be issued as part of the Tender documents and shall be returned by the bidder along with Techno-commercial bid duly filled, signed and stamped by the authorized signatory who signs the bid. Only those vendors / bidders who have entered into such an IP with BHEL shall be considered qualified to participate in the bidding. Entering into this pact shall be a preliminary qualification.

1.2. SUBMISSION OF TENDERS

- 1.2.1 The tenderers must submit their tenders to Officer inviting tender as per instructions in the NIT

Offer shall be submitted online in e procurement portal.

No other mode of offer submission shall be acceptable & shall be rejected.

Note : Party can review & revise their submitted offers till due date & time of submission

- 1.2.2 The tenders received after the specified time of their submission are treated as 'Late Tenders' and shall not be considered under any circumstances.
- 1.2.3 Tenders shall be opened by authorized officer of BHEL as specified in the NIT.

- 1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed the date and time of opening of the Price Bids and such Tenderers may depute their representatives to witness the opening of the price bids. BHEL's decision in this regard shall be final and binding.
- 1.2.5 Before submission of Offer, the tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour, means of transport and access to Site, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions.
- 1.3. LANGUAGE**
- 1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. For the purpose of the tenders, the metric system of units shall be used.
- 1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.
- 1.4 PRICE DISCREPANCY:**
- 1.4.1 **Conventional Price Bid opening :** In the case of price bid opening without resorting to Reverse Auction, if there are differences between the rates given by the tenderer in words and figures or in amount worked out by him, the following procedure for evaluation and award shall be followed:
- i) When there is a difference between the rates in figures and in words, the rates which corresponds to the amounts worked out by the contractor, shall be taken as correct
 - ii) When the amount of an item is not worked out by the contractor or it does not correspond with the rate written either in figure or in words, then the rate quoted by the contractor in words shall be taken as correct.
 - iii) When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.
 - iv) In case of lumpsum price, if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.
 - v) In case of omission in quoting any rate for one or more items, the evaluation shall be done considering the highest quoted rate obtained against the respective items by other tenderers for the subject tender. If the tenderer becomes L-1, the notional rates for the omission items shall be the lowest rates quoted for the respective items by the other tenderers against the respective omission items for the subject job and the 'Total quoted price (loaded for omissions)' shall be arrived at. However the overall price remaining the same as quoted originally, the rates for all the items in the 'Total quoted price (loaded for omissions)' shall be reduced item wise in proportion to the ratio of 'Original' total price and the 'Total quoted price (loaded for omissions)'.
 - vi) The 'Final Total Amount' shall be arrived at after considering the amounts worked out in line with 'i' to 'v' above.
- 1.4.2 **Reverse Auction:** In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. In case of omission of rates, the procedure shall be as per 'Guidelines for Reverse Auction' enclosed.
- 1.5. QUALIFICATION OF TENDERERS**
- i) Only tenderers who have previous experience in the work of the nature and description detailed in the Notice Inviting Tender and/or tender specification are expected to quote for this work duly

- detailing their experience along with offer.
- ii) Offers from tenderers who do not have proven and established experience in the field shall not be considered
- iii) Offers from tenderers who are under suspension (banned) by any Unit/Region/Division of BHEL shall not be considered.
- iv) Offers from tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India shall not be considered.

1.6. EVALUATION OF BIDS

- i) Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer
- ii) In case the same qualifying experience is claimed by more than one agency, then the agency who has executed the work as per documentary evidence submitted shall only be qualified. Scope of qualifying work should be totally with the agency who has executed and in case it is only labour+consumables without T&P, then the responsibility of execution is assigned to the first agency and not to the agency who has executed only as labour supply contractor. Further, BHEL reserves the right to ask for further proofs including submission of TDS certificates for the said job
- iii) In case the qualifying experience is claimed by private organizations based on Work Order and completion certificates from another private organization, BHEL reserves the right to ask for further proofs including submission of TDS certificates for the said job
- iv) Assessing Bidder Capacity for executing the current tender shall be as per Notice Inviting Tender
- v) Price Bids of shortlisted bidders shall only be opened either through the conventional price bid opening or through electronic Reverse Auction, at the discretion of BHEL
- vi) Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated in due course after issue of LOI/LOA to successful bidder and receipt of unqualified acceptance from the successful bidder
- vii) Bidders are advised to also refer to clause no 2.9.4 regarding evaluation of their performance in ongoing projects for the current tender.

1.7. DATA TO BE ENCLOSED

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

- i) **INCOME TAX PERMANENT ACCOUNT NUMBER**
Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company/Firm/Individual Partners, etc. shall be furnished along with tender.
- ii) **ORGANIZATION CHART**
The organization chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.
- iii) Not used
- iv) **IN CASE OF INDIVIDUAL TENDERER:**
His / her full name, address and place & nature of business.
- v) **IN CASE OF PARTNERSHIP FIRM**
The names of all the partners and their addresses, A copy of the partnership deed/instrument of

partnership duly certified by the Notary Public shall be enclosed.

vi) IN CASE OF COMPANIES:

- a. Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished).
- b. Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

1.8 Not used

1.9 EARNEST MONEY DEPOSIT

1.9.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.

- i) EMD shall be furnished before tender opening / along with the offer in full as per the amount indicated in the Special Conditions of Contract / NIT.
- ii) The EMD is to be paid in the following forms:
 - (a) Cash deposit as permissible under the extant Income Tax Act (before tender opening).
 - (b) Electronic Fund Transfer credited in BHEL account (before tender opening).
 - (c) Banker's cheque / Pay order / Demand draft, in favour of 'Bharat Heavy Electricals Limited' and payable at Regional HQ issuing the tender (along with offer).
 - (d) Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).

In addition to above, the EMD amount in excess of Rs. Two lakh may also be accepted in the form of Bank Guarantee from scheduled bank. The Bank Guarantee in such cases shall be valid for atleast six months.

Note: In case required EMD as above is not available at the time of Technical Bid opening, offer of the bidder shall not be considered for further processing.

- iii) No other form of EMD remittance shall be acceptable to BHEL.

iv) The EMD shall be waived in the following cases:

- (a) Joint Venture or Subsidiary companies of BHEL.
- (b) Central/ State PSUs/ Government depts/ Autonomus/ Educational/ Research institutions.

1.9.2 EMD by the Tenderer will be forfeited as per NIT conditions, if:

- i) After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
- ii) The Contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/ LOA/ Contract.

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

1.9.3 EMD shall not carry any interest.

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

1.9.5 EMD of successful tenderer will be retained as part of Security Deposit.

1.10 SECURITY DEPOSIT

- 1.10.1 Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit towards fulfilment of any obligations in terms of the provisions of the contract. The total amount of Security Deposit will be 3% of the contract value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.
- 1.10.2 The security Deposit should be furnished before start of the work by the contractor.
- 1.10.3 The balance amount to make up the required Security Deposit of 3% of the contract value may be accepted in the following forms:-
- Cash (as permissible under the extant Income Tax Act)
 - Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
 - Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
 - Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats.
 - Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
 - Security deposit can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security deposit is collected. However in such cases at least 50% of the required Security Deposit, including the EMD, should be deposited in any form as prescribed before start of the work and the balance 50% may be recovered from the running bills as described above.

(Note: In case of small value contracts not exceeding INR 20 lakhs, work can be started before the required Security Deposit is collected. However, payment can be released only after collection/ recovery of initial 50% Security Deposit).

Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

- 1.10.4 The Security Deposit shall not carry any interest.
- 1.10.5 In case the value of work exceeds / reduces from the awarded / accepted value, the Security Deposit shall be correspondingly enhanced / reduced as given below:
- The enhanced part of the Security Deposit shall be immediately deposited by the Contractor or adjusted against payments due to the Contractor.
 - There will be no reduction in Security Deposit value in case of variation in contract value upto the lower limit specified in Quantity variation clause. In case of reduction of contract value beyond the lower limit specified in Quantity Variation clause, then the Security Deposit shall be re adjusted in proportion.
 - In case of reduction, the reduced Contract value shall be certified by BHEL Construction Manager after ascertaining / freezing of BOQ / Drawings from the Design / Engineering Centre. The reduced Security Deposit value can only be considered after taking into account the adequacy of the securities held by BHEL to meet the liabilities of the contractor for the contract,

and the performance of the contract in general. **In such cases, the revised value of Security Deposit shall be worked out only after execution of not less than the lower limit of the revised scope of work/contract value as per quantity variation clause, and as certified by Construction Manager. This reduction in value of Security Deposit shall not entitle the contractor to any amendment of Contract and shall be operated at the discretion of BHEL**

- iv) Contract value for the purpose of operating the reduced/increased value of Security Deposit due to Quantity Variation, shall be exclusive of Price Variation Clause, Over Run Compensation and Extra works done on manday rates.
- v) The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of BHEL.

1.10.6 The validity of Bank Guarantees towards Security Deposit shall be initially upto the completion period as stipulated in the Letter of Intent/Award + 3 months, and the same shall be kept valid by proper renewal till the acceptance of Final Bills of the Contractor, by BHEL.

1.10.7 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.

1.11 RETURN OF SECURITY DEPOSIT

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

1.12 BANK GUARANTEES

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with

- i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act.
- ii) The Bank Guarantees shall be as per prescribed formats.
- iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period (subject to a minimum period of six months), as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.
- iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by the Construction Manager and submitted to the Regional HQ issuing the LOI/LOA.
- v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.
- vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.
- vii) The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due), addressed to the Subcontracting Department of the respective Region.

1.13 VALIDITY OF OFFER

The rates in the Tender shall be kept open for acceptance for a minimum period of **SIX MONTHS** from latest due date of offer submission (including extension, if any). In case BHEL (Bharat Heavy Electricals Ltd) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

1.14 EXECUTION OF CONTRACT AGREEMENT

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent/ Award by Bharat Heavy Electricals Limited. The Tenderer shall submit an unqualified acceptance to the Letter of Intent/Award within the period stipulated therein.

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

1.15 REJECTION OF TENDER AND OTHER CONDITIONS

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

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

1.15.2 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.

1.15.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL, or tenderer under suspension (hold/banning /delisted) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule in line with clause no. 9.0 of the 'NIT'. The decision of BHEL will be final in this regard.

1.15.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.

1.15.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognise such power of Attorney and changes after obtaining proper legal advice, the cost of which will be

chargeable to the contractor concerned.

- 1.15.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.
- 1.15.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.
- 1.15.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed of the fact as per specified format, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.
- 1.15.9 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site Incharge. The tenderer is solely responsible to BHEL for the work awarded to him.
- 1.15.10 The tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder.
- 1.15.11 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e contract value shall be worked out after considering the discount so offered.
- 1.15.12 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

CHAPTER-2

2.1 **DEFINITION:** The following terms shall have the meaning hereby assigned to them except where the context otherwise requires

- i) BHEL shall mean Bharat Heavy Electricals Limited (of the respective Power Sector Region inviting the Tender), a company registered under Indian Companies Act 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI – 110 049, or its Power Sector Regional Offices or its Authorised Officers or its Site Engineers or other employees authorised to deal with any matters with which these persons are concerned on its behalf.
- ii) “EXECUTIVE DIRECTOR” or ‘GROUP GENERAL MANAGER’ or “GENERAL MANAGER (Incharge)” or “GENERAL MANAGER” shall mean the Officer in Administrative charge of the respective Power Sector Region.
- iii) “COMPETENT AUTHORITY” shall mean Executive Director or Group General Manager or General Manager (Incharge) or General Manager or BHEL Officers who are empowered to act on behalf of the Executive Director or General Manager (Incharge) or General Manager of BHEL.
- iv) “ENGINEER” or “ENGINEER IN CHARGE” shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as “Engineer” on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes ‘CONSTRUCTION MANAGER’ or ‘SITE INCHARGE’ as well as Officers at Site or at the Headquarters of the respective Power Sector Regions.
- v) “SITE” shall mean the places or place at which the plants/equipments are to be erected and services are to be performed as per the specification of this Tender.
- vi) “CLIENT OF BHEL” or “CUSTOMER” shall mean the project authorities with whom BHEL has entered into a contract for supply of equipments or provision of services.
- vii) “CONTRACTOR” shall mean the successful Bidder/Tenderer who is awarded the Contract and shall include the Contractor’s successors, heirs, executors, administrators and permitted assigns.
- viii) “CONTRACT” or “CONTRACT DOCUMENT” shall mean and include the Agreement of Work Order, the accepted appendices of Rates, Schedules, Quantities if any, General Conditions of Contract, Special Conditions of Contract, Instructions to the Tenderers, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments mutually agreed upon and the Letter of Intent/Award/Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement.
- ix) “GENERAL CONDITIONS OF CONTRACT” shall mean the ‘Instructions to Tenderers’ and ‘General Conditions of Contract’ pertaining to the work for which above tenders have been called for.
- x) “TENDER SPECIFICATION” or “TENDER” or “TENDER DOCUMENTS” shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical

	Specifications, Appendices, Annexures, Corrigendums, Amendments, Forms, procedures, Site information, etc and drawings/documents pertaining to the work for which the tenderers are required to submit their offers. Individual specification number will be assigned to each Tender Specification.
xi)	“LETTER OF INTENT/ AWARD” shall mean the intimation by a Letter/Fax/email to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.
xii)	“COMPLETION TIME” shall mean the period by ‘date/month’ specified in the ‘Letter of Intent/Award’ or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.
xiii)	“PLANT” shall mean and connote the entire assembly of the plant and equipments covered by the contract.
xiv)	“EQUIPMENT” shall mean equipment, machineries, materials, structural, electricals and other components of the plant covered by the contract.
xv)	“TESTS” shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL, in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.
xvi)	“APPROVED”, “DIRECTED” or “INSTRUCTED” shall mean approved, directed or instructed by BHEL.
xvii)	“WORK or CONTRACT WORK” shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipments to the entire satisfaction of BHEL.
xviii)	“SINGULAR AND PLURALS ETC” words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.
xix)	“HEADING” – The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.
xx)	“MONTH” shall mean calendar month unless otherwise specified in the Tender.
xxi)	Day’ or ‘Days’ unless herein otherwise expressly defined shall mean calendar day or days of twenty four (24) hours each. A week shall mean continuous period of seven (7) days.
xxii)	“COMMISSIONING” shall mean the synchronisation testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for

	taking into service.
xxiii)	“WRITING” shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.
xxiv)	“TEMPORARY WORK” shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.
xxv)	‘CONTRACT PRICE’ or ‘CONTRACT VALUE’ shall mean the sum mentioned in the LOI/LOA/Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained
xxvi)	“COMMENCEMENT DATE” or “START DATE” shall mean the commencement/start of work at Site as per terms defined in the Tenderl
xxvii)	“SHORT CLOSING” or “FORE CLOSING” of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor
xxviii)	“TERMINATION” of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract
xxix)	“DE MOBILISATION” shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor
xxx)	“RE MOBILISATION” shall mean the resumption of work with all resources required for the work after demobilization.
2.2	LAW GOVERNING THE CONTRACT AND COURT JURISDICTION The contract shall be governed by the Law for the time being in force in the Republic of India. Subject to clause 2.21.1 or 2.21.2 of this contract, the Civil Court having original Civil Jurisdiction at Delhi for PSNR, at Kolkata for PSER, at Nagpur for PSWR and at Chennai for PSSR, shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract.
2.3	ISSUE OF NOTICE 2.3.1 Service of notice on contractor Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by Registered Post / Speed Post to or leaving the same at the Contractor’s last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such posting or leaving of the notice shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice. 2.3.2 Service of notice on BHEL Any notice to be given to BHEL in-charge/Region under the terms of the Contract shall be served by sending the same by post to or leaving the same at BHEL address or changed address as notified in writing by BHEL to the Contractor.
2.4	USE OF LAND No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

2.5 COMMENCEMENT OF WORK

- 2.5.1** The contractor shall commence the work as per the time indicated in the Letter of Intent/Award from BHEL and shall proceed with the same with due expedition without delay.
- 2.5.2** If the contractor fails to start the work within stipulated time as per LOI/ LOA or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract. The Earnest Money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.
- 2.5.3** All the work shall be carried out under the direction and to the satisfaction of BHEL.

2.6 MEASUREMENT OF WORK AND MODE OF PAYMENT:

- 2.6.1** All payments due to the contractors shall be made by e mode only, unless otherwise found operationally difficult for reasons to be recorded in writing.
- 2.6.2** For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.
- 2.6.3** These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.
- 2.6.4** Based on the above quantities, contractor shall prepare the bills in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.
- 2.6.5** All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.
- 2.6.6** Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.
- 2.6.7** The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.
- 2.6.8** The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.
- 2.6.9** If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.

2.6.10 Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.

2.6.11 Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.

2.7 RIGHTS OF BHEL

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.

2.7.1 In case of inadequate manpower deployed by the contractor, BHEL reserves the right to deploy additional manpower through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor and payments and other statutory compliances related to manpower shall be the contractor's responsibility. In case of contractor's failure to fulfill his obligations in respect of such manpower, BHEL reserves the right to take necessary action as per contract conditions.

2.7.2 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.

2.7.3.1 To terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of 14 days' by BHEL in any of the following cases:

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

Risk & Cost Amount against Balance Work:

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

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

Where,

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

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

H = Overhead Factor to be taken as 5

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

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

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

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

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

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

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

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

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

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

- i). Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
- ii). Let the value of executed work till the time of termination of contract = X
- iii). Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y
- iv). Delay in executed work attributable to contractor i.e. $T2 = [1 - (X/Y)] \times T1$
- v). LD shall be calculated in line with LD clause (clause 2.7.9) of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.

2.7.3.2 In case Contractor fails to deploy the resources as per requirement, BHEL can deploy own/hired/otherwise arranged resources at the risk and cost of the contractor and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.

2.7.4 Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor

Following sequence shall be applicable for recoveries from contractor:

- a) Dues available in the form of Bills payable to contractor, SD, BGs against the same contract.
- b) Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above.
- c) If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery:
 - i) Dues payable to contractor against other contracts in the same Region shall be considered for recovery.
 - ii) If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor.
 - iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.

2.7.5 To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, as per mutual agreement.

2.7.6 To effect recovery from any amounts due to the contractor under this or any other contract or in any other form, the moneys BHEL is statutorily forced to pay to anybody, due to contractor's failure to fulfill any of his obligations. BHEL shall levy overheads of 5% on all such payments along with interest as defined elsewhere in the GCC.

2.7.7 While every endeavour will be made by BHEL to this end, they cannot guarantee uninterrupted work due to conditions beyond their control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.

2.7.8 In case the execution of works comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than two months, due to reasons not attributable to the contractor and other than Force Majeure conditions, BHEL may consider permitting the contractor to de mobilize forthwith and re mobilize at an agreed future date. Cost of such demobilization/remobilization shall be mutually agreed. ORC in such cases shall not be applicable for the period between the period of demobilization and re mobilisation. The duration of contract/time extension shall accordingly get modified suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

2.7.9 In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts, etc, due to which inordinate discontinuity of work is anticipated, BHEL on its own or contractor's request at its discretion may consider to short close the contract in following cases:

- a) The balance works (including but not limited to Trial Operation, PG Test, etc) are minor vis a vis the scope of work envisaged as per the contract.
- b) There has been no significant work in past 6 months OR no significant work is expected in next 6 months (example in Hydro projects or in projects where work has stopped due to reasons beyond the control of BHEL)

- c) The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other reasons not attributable to the contractor.
- d) Work does not start within six months of LOI/ LOA date.

At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test, etc) as mutually agreed, shall however be reduced from the final contract value.

2.7.10 LIQUIDATED DAMAGES/PENALTY

If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0. 5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value. For this purpose, the period of delay shall be the delay attributable to the Contractor for the completion of work as per contract. Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Manday rate basis, Supplementary/ Additional Items and PVC.

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

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

- 2.8.1** As far as possible, Unskilled Workers shall be engaged from the local areas in which the work is being executed.
- 2.8.2** The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.
- 2.8.3** The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Regulations, Notifications, etc. such as Payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employers Provident Act, Employees State Insurance Scheme, Contract Labour (Regulation and Abolition) Act, 1970, Payment of Bonus & Gratuity Act, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, The Building and Other Construction Workers' Welfare Cess Act, 1996 and other Acts, Rules, and Regulations for labour/workers as applicable and as may be enacted by the State Government and Central Govt. during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also comply with provisions of and give all such notices to the local Governing Body, Police and other relevant Authorities as may be required by the Law.
- 2.8.4** The Contractor shall obtain independent License under the Contract Labour (Regulations and Abolition) Act, 1970 for engaging contract labour as required from the concerned Authorities based on the certificate (Form- V) issued by the Principal Employer/Customer.

- 2.8.5** The contractor shall pay and bear all taxes, fees, license charges, Cess, duties, deposits, tolls, royalties, commission or other charges which may be leviable on account of his operations in executing the contract.
- 2.8.6** While BHEL would pay the inspection fees and Registration fees of Boiler/Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.
- 2.8.7** Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.
- 2.8.8** The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.
- 2.8.9** The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.
- 2.8.10** The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.
- 2.8.11** All the properties/equipments/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.
- 2.8.12** The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipments/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc, the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor
- 2.8.13** In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract
- 2.8.14** Any delay in completion of works/or non achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.
- 2.8.15** The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.
- 2.8.16** All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as

may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract.

The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices.

Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer

- 2.8.17** The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for record purpose, if so called for.

Contractor shall create awareness amongst their workforce by helping & encouraging in opening bank accounts and to encourage them to adopt digital mode of transactions. While releasing wages/salary to their workers/ supervisors/ staff, Contractor shall comply with the GOI's guidelines for maximizing such transactions through Non-Cash / digital means.

- 2.8.18** In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

- 2.8.19** Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.

- 2.8.20** The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Client whichever is earlier.

- 2.8.21** The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly

- 2.8.22** The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices, etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.

- 2.8.23** The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to

the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.

2.8.24 The Contractor to note that some of BHEL's T&Ps/MMDs may not be insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time, BHEL will reserve the right to recover the loss from the contractor.

2.8.25 For all works having contract value of Rs. 5,00,000/- or above, BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life/ permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

- a) Victim: Any person who suffers permanent disablement or dies in an accident as defined below.
- b) Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works/ during working at BHEL Units/ Offices/ townships and premises/ Project Sites.
- c) Compensation in respect of each of the victims:
 - i. In the event of death or **permanent disability** resulting from Loss of both limbs: Rs. 10,00,000/- (Rs. Ten Lakh).
 - ii. In the event of **other permanent disability**: Rs.7,00,000/- (Rs. Seven Lakh)
- d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to section 2 (l) of the Employee's Compensation Act, 1923.

2.9 PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION

2.9.1 A detailed plan/ programme for completion of the contractual scope of work as per the time schedule given in the contract shall be jointly agreed between BHEL and Contractor, before commencement of work. The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis a vis this jointly agreed programme. The Contractor shall submit periodical progress reports (Daily/Weekly/Monthly) and other reports/information including manpower, consumables, T&P mobilization etc as desired by BHEL.

2.9.2 Monthly progress review between BHEL and Contractor shall be based on the agreed programme as above, availability of inputs/fronts etc, and constraints if any, as per prescribed formats. Manpower, T&P and consumable reports as per prescribed formats shall be submitted by contractor every month. Release of RA Bills shall be contingent upon certification by BHEL Site Engineer of the availability of the above prescribed formats duly filled in and signed.

2.9.3 The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. The monthly progress review shall record shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL

2.9.4 Performance of the Contractor shall be assessed as per prescribed formats and shall form the basis for 'Annual/Overall Performance Evaluation' of the Contractor and also for 'Assessment of Capacity of Bidder' for Tenders where the Contractor is a bidder. BHEL reserves the right to revise the evaluation formats during the course of execution of the works

2.10 TIME OF COMPLETION

2.10.1 The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers

2.10.2 The entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL under clause 2.11.

2.11 EXTENSION OF TIME FOR COMPLETION

2.11.1 If the completion of work as detailed in the scope of work gets delayed beyond the contract period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract.

2.11.2 Based on the monthly reviews jointly signed, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.

2.11.3 However if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.

2.11.4 A joint programme shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources (with weightages) to be deployed by the contractor as per specified format. Review of the programme and record of shortfall shall be done every month of the 'Time extension' period in the same manner as is done for the regular contract period.

2.11.5 During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program.

2.11.6 At the end of total work completion as certified by BHEL Engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/levied for the portion of time extensions attributable to contractor and recoverable from the dues payable to the contractor.

2.12 OVERRUN COMPENSATION (ORC) : Not Applicable.

2.13 INTEREST BEARING RECOVERABLE ADVANCES : Not Applicable.

2.14 QUANTITY VARIATION

2.14.1 The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). The quoted rates for individual items shall remain firm irrespective of any variations in the individual quantities. No compensation becomes payable in case the variation of the final executed contract value is within the limits of Minus (-) 15% of awarded contract value.

2.14.2 Compensation due to variation of final executed value in excess of the limits defined in clause above, shall be as follows:

- i) In case the finally executed contract value reduces below the lower limit of awarded Contract Value due to quantity variation specified above, the contractor will be eligible for compensation @ 15% of the difference between the lower limit of the awarded contract value and the actual executed contract value.
- ii) In case the finally executed contract value increases above the awarded Contract Value due to quantity variation, there will be no upward revision in the rates for the individual items and also contractor is not eligible for any compensation.

2.15 EXTRA WORKS

2.15.1 All rectifications/modifications, revamping, and reworks required for any reasons not due to the fault of the contractor, or needed due to any change in deviation from drawings and design of equipments, operation/maintenance requirements, mismatching, or due to damages in transit, storage and erection/commissioning, and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.

2.15.2 Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

2.15.3 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.

2.15.4 BHEL retains the right to award or not to award any of the major repair/ rework/modification/rectification/fabrication works to the contractor, at their discretion without assigning any reason for the same

2.15.5 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

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

Rs. 108 /- per man hour.

2.15.6 The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable for extra works. Rate revision, Over Run Charges/compensation etc will not be applicable due to extra works.

2.15.7 Extra Works for Civil Packages shall be regulated as follows

- i) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re erecting etc due to no fault of Contractor, shall be in the order of the following:
 - a) Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule) with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities.
 - b) As per CPWD-DSR-2007 (or latest edition) with applicable escalation derived from All India Consumer price Index for Whole Sale Commodities, OR, Notification issued by the office of CPWD for 'Cost Index' in that Region where the project is being executed, whichever is less
 - c) Item rates are to be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor, plus 15% towards Contractor's overheads and profit.
- ii) PVC and ORC will not be applicable for (i) above.

2.16 SUPPLEMENTARY ITEMS

2.16.1 For NON Civil Works

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

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

2.16.2 For Civil Works

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

2.17 PRICE VARIATION COMPENSATION : Not Applicable.

2.18 INSURANCE

2.18.1 BHEL/their customer shall arrange for insuring the materials/properties of BHEL/customer covering the risks during transit, storage, erection and commissioning.

2.18.2 It is the sole responsibility of the contractor to insure his materials, equipments, workmen, etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per

Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.

- 2.18.3 If due to negligence and or non-observation of safety and other precautions by the contractors, any accident/injury occurs to the property / manpower belong to third party, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.
- 2.18.4 The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss due to theft or otherwise till the same is taken over by BHEL or customer. For lodging / processing of insurance claim the contractor will submit necessary documents. BHEL will recover the loss including the deductible franchise from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance. However this will not relieve the contractor of his contractual obligation for the material in his custody.

2.19 STRIKES & LOCKOUT

- 2.19.1 The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, BHEL shall have the right to get the work executed through any other agencies and the cost so incurred by BHEL shall be deducted from the Contractor's bills.
- 2.19.2 For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL

2.20 FORCE MAJEURE

- 2.20.1 Force Majeure" shall mean any event beyond the reasonable control of the parties including but not limited to fire, flood, earthquake or other acts of God, war, riots, civil war and restraints of Governing States, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected. The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party : a) any strike, work-to-rule action, go-slow or similar labour difficulty (b) late delivery of equipment or material (unless caused by Force Majeure event) and (c) economic hardship.
- 2.20.2 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event.
- 2.20.3 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event.

- 2.20.4 Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not
- Constitute a default or breach of the Contract.
 - Give rise to any claim for damages or additional cost or expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure.

2.20 ARBITRATION & CONCILIATION

2.21.1 ARBITRATION:

2.21.1.1 Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause 2.21.2 herein below or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract (hereinafter referred to as the 'Dispute'), then, either Party may, commence arbitration in respect of such Dispute by issuance of a notice in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice'). The Notice shall contain the particulars of all claims to be referred to arbitration in sufficient detail and shall also indicate the monetary amount of such claim. The arbitration shall be conducted by a sole arbitrator to be appointed by the Head of the BHEL Power Sector Region issuing the Contract within 60 days of receipt of the complete Notice. The language of arbitration shall be English.

The Arbitrator shall pass a reasoned award.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder as in force from time to time shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be New Delhi/ delhi. The Contract shall be governed by and be construed as per provisions of the laws of India. Subject to this provision 2.21.1.1 regarding ARBITRATION, the principal civil court exercising ordinary civil jurisdiction over the area where the seat of arbitration is located shall have exclusive jurisdiction over any DISPUTE to the exclusion of any other court.

2.21.1.2 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018 as amended from time to time.

2.21.1.3 The cost of arbitration shall initially be borne equally by the Parties subject to the final allocation thereof as per the award/order passed by the Arbitrator.

2.21.1.4 Notwithstanding the existence of any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner

unless the dispute inter-alia relates to cancellation, termination or short-closure of the Contract by BHEL.

2.21.2 CONCILIATION:

If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.
2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure 2.3 to this GCC. The Procedure 2.3 together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this GCC.

The Contractor hereby agrees that BHEL may make any amendments or modifications to the provisions stipulated in the Procedure 2.3 to this GCC from time to time and confirms that it shall be bound by such amended or modified provisions of the Procedure 2.3 with effect from the date as intimated by BHEL to it.

2.21.3 No Interest payable to Contractor

Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final Bill, or any amount withheld and/or appropriated by BHEL etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise.

2.22 RETENTION AMOUNT

2.22.1 Retention Amount shall be 5% of executed contract value and shall be recovered at the rate of 5% from each Running Bill admitted, including PVC Bills.

2.22.2 Refund of Retention Amount shall be as follows:

- i) 50% of retention amount along with 'Final Bill'
- ii) Balance 50% of retention amount shall be retained towards 'Performance Guarantee for Workmanship' and shall become refundable after expiry of Guarantee period, provided all the defects noticed during the guarantee period have been rectified to the satisfaction of BHEL

Site Engineer/BHEL Construction Manager, and after deducting all expenses/other amounts due to BHEL under the contract/other contracts entered into by BHEL with them. This portion of the retention amount can be released on commencement of the Guarantee period, on submission of equivalent Bank Guarantee.

2.23 PAYMENTS

Payments to Contractors are made in any one of the following forms

2.23.1 Running Account Bills (RA Bills)

- i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).
- ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents
- iii) Recoveries on account of electricity, water, statutory deductions, etc are made as per terms of contract
- iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to re do the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non availability of fronts 'OR' non availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.
- v) In order to facilitate part payment, BHEL Site Engineer at his discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work

2.23.2 Final Bill

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

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

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

2.24 PERFORMANCE GUARANTEE FOR WORKMANSHIP

- 2.24.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of twelve months from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to

any other rights and recover the same from the Guarantee money.

2.24.2 BHEL shall release the guarantee money subject to the following

- i) Contractor has submitted 'Final Bill'
- ii) Guarantee period as per contract has expired
- iii) Contractor has furnished 'No Claim Certificate' in specified format
- iv) BHEL Site Engineer/Construction Manager has furnished the 'No Demand Certificate' in specified format
- v) Contractor has carried out the works required to be carried out by him during the period of Guarantee and all expenses incurred by BHEL on carrying out such works is included for adjustment from the Guarantee money refundable.

2.25 CLOSING OF CONTRACTS

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

2.26 REVERSE AUCTION:

BHEL reserves the right to go for Reverse Auction for Price Bid Opening by BHEL appointed service provider, instead of opening the submitted sealed price bid in the conventional way. The Business Rules for Reverse Auction shall be as per BHEL guidelines issued from time to time.

2.27 SUSPENSION OF BUSINESS DEALINGS

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

2.28 OTHER ISSUES

- 2.28.1 Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 100/- unless otherwise required under relevant statutes.
- 2.28.2 In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.
- 2.28.3 Unless otherwise specified in NIT, offers from consortium/ JVs shall not be considered.
- 2.28.4 BHEL may not insist for signing of Contract Agreements in respect of low value and short time period contracts like providing services for Hot water flushing, Chemical Cleaning, Transportation, etc.

Rev 01

1st June
2012

FORMS & PROCEDURES

(Document No. PS:MSX:F&P)

BHARAT HEAVY ELECTRICALS
LIMITED



FORMS & PROCEDURES

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FORMS & PROCEDURES

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: will be released later

OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER
(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

Offer Reference No:.....

Date:.....

To,

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

Dear Sir,

Sub : Submission of Offer against Tender Specification No:

I/We hereby offer to carry out the work detailed in the Tender Specification issued by Bharat Heavy Electricals Limited, Power Sector-....., in accordance with the terms and conditions thereof.

I/We have carefully perused the following listed documents connected with the above work and agree to abide by the same.

1. Amendments/Clarifications/Corrigenda/Errata/etc issued in respect of the Tender documents by BHEL
2. Notice Inviting Tender (NIT)
3. Price Bid
4. Technical Conditions of Contract
5. Special Conditions of Contract
6. General Conditions of Contract
7. Forms and Procedures

Should our Offer be accepted by BHEL for Award, I/we further agree to furnish 'Security Deposit' for the work as provided for in the Tender Conditions within the stipulated time as may be indicated by BHEL.

I/We further agree to execute all the works referred to in the said Tender documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

I/We have deposited/depositing herewith the requisite Earnest Money Deposit (EMD) as per details furnished in the Check List.

Authorised Representative of Bidder

Signature :

Name :

Address :

Place:

Date:

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

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

To,

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

Dear Sir,

Sub : **Declaration by Authorised Signatory**

Ref : 1) NIT/Tender Specification No:
2) All other pertinent issues till date

I/We, hereby certify that all the information and data furnished by me with regard to the above Tender Specification are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations and all other pertinent issues till date, and agree to comply with the requirements and Intent of the specification.

I further certify that I am authorised to represent on behalf of my Company/Firm for the above mentioned tender and a valid Power of Attorney to this effect is also enclosed.

Yours faithfully,

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

Date:

Enclosed : Power of Attorney

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

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

To,

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

Dear Sir,

Sub : **Declaration by Authorised Signatory regarding Authenticity of submitted documents.**

Ref : 1) NIT/Tender Specification No:
2) All other pertinent issues till date

I/We, hereby certify that all the documents submitted by us in support of possession of “Qualifying Requirements” are true copies of the original and are fully compliant required for qualifying / applying in the bid and shall produce the original of same as and when required by Bharat Heavy Electricals Limited.

I / We hereby further confirm that no tampering is done with documents submitted in support of our qualification as bidder. I / We understand that at any stage (during bidding process or while executing the awarded works) if it is found that fake / false / forged bid qualifying / supporting documents / certificates were submitted, it would lead to summarily rejection of our bid / termination of contract. BHEL shall be at liberty to initiate other appropriate actions as per the terms of the Bid / Contract and other extant policies of Bharat Heavy Electricals Limited.

Yours faithfully,

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

Date:

NO DEVIATION CERTIFICATE

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

To,

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

Dear Sir,

Sub : **No Deviation Certificate**

Ref : 1) NIT/Tender Specification No:,

2) All other pertinent issues till date

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

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

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

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

Thanking you,

Yours faithfully,

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

DECLARATION CONFIRMING KNOWLEDGE ABOUT SITE CONDITIONS
(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No:,

2) All other pertinent issues till date

I/We, _____ hereby declare and confirm that we have visited the Project Site as referred in BHEL Tender Specifications and acquired full knowledge and information about the Site conditions including Wage structure, Industrial Climate, the Law & Order and other conditions prevalent at and around the Site. We further confirm that the above information is true and correct and we shall not raise any claim of any nature due to lack of knowledge of Site conditions.

I/We, hereby offer to carry out work as detailed in above mentioned Tender Specification, in accordance with Terms & Conditions thereof.

Yours faithfully,

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

Date :

Place:

DECLARATION FOR RELATION IN BHEL

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder failing which the offer of Bidder is liable to be summarily rejected)

To,

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

Dear Sir,

Sub : **Declaration for relation in BHEL**

Ref : 1) NIT/Tender Specification No:,

I/We hereby submit the following information pertaining to relation/relatives of Proprieter/Partner(s)/Director(s) employed in BHEL

Tick(✓) any one as applicable:

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

OR

2. The Proprieter, Partner(s), or Director(s) of our Company/Firm HAVE relation/relatives employed in BHEL and their particulars are as below:

(i)

(ii)

Signature of the Authorised Signatory

Note:

1. Attach separate sheet, if necessary.
2. If BHEL Management comes to know at a later date that the information furnished by the Bidder is false, BHEL reserves the right to take suitable against the Bidder/Contractor.

NON DISCLOSURE CERTIFICATE

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

NON DISCLOSURE CERTIFICATE

I/We understand that BHEL PS __ is committed to Information Security Management System as per their Information Security Policy.

Hence, I/We M/s.....
who are submitting offer for providing services to BHEL PS __ against
Tender Specification No:_____,
hereby undertake to comply with the following in line with Information
Security Policy of BHEL PS __, _____

- To maintain confidentiality of documents & information which shall be used during the execution of the Contract.
- The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PS__.

(Signature, date & seal of Authorized
Signatory of the bidder)

Date:

BANK ACCOUNT DETAILS FOR E-PAYMENT

(To be given on Letter head of the Company /Firm of Bidder, and **ENDORSED (SIGNED & STAMPED) BY THE BANK** to enable BHEL release payments through Electronic Fund Transfer (EFT/RTGS))

1. Beneficiary Name :
2. Beneficiary Account No. :
3. Bank Name & Branch :
4. City/Place :
5. 9 digit M ICR Code of Bank Branch :
6. IFSC Code of Bank Branch :
7. Beneficiary E-mail ID :
(for payment confirmation)

NOTE: In case Bank endorsed certificate regarding above has already been submitted earlier, Kindly submit photocopy of the same

FORMAT FOR SEEKING CLARIFICATION

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

To,

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

Dear Sir,

Sub : **Request for Clarification**Ref : 1) NIT/Tender Specification No:
2) All other pertinent issues till date

Sl no	Reference clause of Tender Document	Existing provision	Bidder's query	BHEL's clarification
1				
2				
3				
4				
5				
6				

Yours faithfully,

(Signature, date & seal of Authorized
Representative of the Bidder)

CAPACITY EVALUATION OF BIDDERS FOR CURRENT TENDER

SL NO.	DESCRIPTION OF WORK (Similar to Tendered Scope)	WORK ORDER REF & DATE	CONTRACT VALUE (Rs. LACS)	CUSTOMER NAME & ADDRESS	CURRENT STATUS OF THE JOB ALONG WITH LATEST MILE STONE COMPLETED	%AGE OF WORK COMPLETE D	VALUE OF BALANCE WORK (Rs. Lacs)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

NOTES:

1. BIDDERS ARE REQUIRED TO FURNISH ALL THE JOBS OF SIMILAR NATURE WHICH THEY ARE EXECUTING (IN PROGRESS) AT THE TIME OF SUBMISSION OF TENDER, AS PER ABOVE FORMAT.

2. BIDDERS HEREBY UNDERTAKE THAT THEY HAVE FURNISHED THE DETAILS SOUGHT AS PER POINT NO. 1 IN TOTALITY AND THAT THE DETAILS FURNISHED IS COMPLETE IN ALL RESPECT.

3. BHEL WILL TAKE APPROPRIATE ACTION AS DEEMED FIT , IN CASE, IT IS FOUND AT A LATER DATE THAT THE CONTRACTOR HAD SUPPRESSED THE FACTS AND HAVE NOT FURNISHED THE CORRECT & COMPLETE INFORMATIONS.

DATE :
PLACE:

Signature

Name, Designation & Seal of Bidder

CONTRACT AGREEMENT

Form No: F-10 (Rev 00)

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector – Region

.....

.....

CONTRACT AGREEMENT

AGREEMENT NO. _____

NAME OF WORK	
NAME OF THE CONTRACTOR WITH FULL ADDRESS	
VALUE OF WORK AWARDED	
LETTER OF AWARD NO.	
TIME ALLOTTED FOR COMPLETING THE WORK (DATE OF COMPLETION)	

SIGNATURE OF CONTRACTOR

(SIGNATURE OF BHEL OFFICER)

CONTRACT AGREEMENT

THIS AGREEMENT MADE THIS _____ DAY OF _____ between BHARAT HEAVY ELECTRICALS LIMITED (A Government of India Enterprise) a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort New Delhi-110049 (herein after called BHEL) of the ONE PART.

AND

M/S _____
_____ (hereinafter called the 'Contractor') of the
SECOND PART.

WHEREAS M/s -----state that they
have acquired and possess extensive experience in the field of -----

And Whereas in response to an Invitation to Tender No. ----- issued by BHEL for
execution of ----- the contractor submitted their offer
No.-----dated -----And whereas BHEL has accepted the
offer of the Contractor on terms and conditions specified in the Letter of Award No.-----
-----dated -----read with the references cited therein.

THIS AGREEMENT WITNESSES AND it is hereby agreed by and between the parties as follows:

1. That the contractor shall execute the work of -----and more particularly described in Tender Specification No -----including Drawings and Specifications (hereinafter called the said works) in accordance with and subject to terms and conditions contained in these presents, instructions to Tenderers, General Conditions of Contract, Special Conditions, Annexures, Letter of Award dated ----- and such other instructions, Drawings, Specifications given to him from time to time by BHEL.
2. The Contractor is required to furnish to BHEL Security deposit in the form of cash/ approved securities/ Bank Guarantee valid upto ----- for a sum of Rs.----- towards satisfactory performance and completion of the Contract.
3. The Contractor has furnished a Bank Guarantee bearing no.-----dated ----- for a sum of Rs.-----executed by ----- in favour of BHEL towards Security Deposit valid upto -----

OR

The Contractor has furnished to BHEL an initial Security Deposit of Rs.-----in the form of cash / approved Securities/ B.G No.----- dated ----- for Rs.-----executed by ----- in favour of BHEL valid upto ----- and has agreed for recovery of the balance security deposit by BHEL @ 10% of the value of work done from each running bill till the entire Security Deposit is recovered.

OR

The contractor has furnished to BHEL an initial Security Deposit of Rs.-----(Rs.-----vide Bank draft No.-----dated -----and by adjusting EMD of Rs.-----submitted vide Bank draft No.----- dt.-----) and has agreed for recovery of balance Security Deposit by BHEL @ 10% of the value of work done from each running bill till the entire security deposit is recovered.

4. The Contractor hereby agrees to extend the validity of the Bank Guarantee for such further period or periods as may be required by BHEL and if the Contractor fails to obtain such extension(s) from the Bank, the Contractor, shall pay forthwith or accept recovery of Rs.----- from the bills in one installment and the contractor further agrees that failure to extend the validity of the Bank Guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum of Rs.-----

OR

In case the contractor furnishes the bank guarantee at a later date the contractor hereby agrees to extend the validity of bank guarantee for such further period or periods as may be required by BHEL and if the contractor fails to obtain such extension(s) from the bank, the contractor shall pay forthwith or accept recovery of the amount of bank guarantee given in lieu of security deposit from the bills in one installment and the contractor further agrees that failure to extend the validity of bank guarantee or failure to pay the aforesaid amount in the manner specified above shall constitute breach of contract. In addition to above, BHEL shall be entitled to take such action as deemed fit and proper for recovering the said sum.

5. That in consideration of the payments to be made to the Contractor by BHEL in accordance with this Agreement the Contractor hereby covenants and undertakes with BHEL that they shall execute, construct, complete the works in conformity, in all respects, with the terms and conditions specified in this Agreement and the documents governing the same.
6. That the Contractor shall be deemed to have carefully examined this Agreement and the documents governing the same and also to have satisfied himself as to the nature and character of the Works to be executed by him.
7. That the Contractor shall carry out and complete the execution of the said works to the entire satisfaction of the Engineer or such other officer authorised by BHEL, within the agreed time schedule.
8. That BHEL shall, after proper scrutiny of the bills submitted by the Contractor; pay to him during the progress of the said works such sum as determined by BHEL in accordance with this Agreement.
9. That this Agreement shall be deemed to have come into force from ----- the date on which the letter of Award has been issued to the Contractor.
10. That whenever under this contract or otherwise, any sum of money shall be recoverable from or payable by the Contractor, the same may be deducted in the manner as set out in the General Conditions of Contract or other conditions governing this Agreement.
11. That all charges on account of Octroi, Terminal and other taxes including sales tax or other duties on material obtained for execution of the said works shall be borne and paid by the Contractor.
12. That BHEL shall be entitled to deduct from the Contractor's running bills or otherwise Income Tax as per prevailing Income Tax Act.
13. That BHEL shall be further entitled to recover from the running bills of the Contractor or otherwise such sum as may be determined by BHEL from time to time in respect of

CONTRACT AGREEMENT

Form No: F-10 (Rev 00)

consumables supplied by BHEL, hire charges for tools and plants issued (Where applicable) and any other dues owed by the Contractor.

14. That it is hereby agreed by and between the parties that non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents and the liability of the Contractor with respect to compensation payable to BHEL or Contractor's obligations shall remain unaffected.
15. It is clearly understood by and between the parties that in the event of any conflict between the Letter of Award and other documents governing this Agreement, the provisions in the Letter of Award shall prevail.

16. The following documents

1. Invitation to Tender No-----
and the documents specified therein.
2. Contractor's Offer No-----
dated-----.
3. _____
4. _____
5. _____
6. Letter of Award No. _____ dated _____.
7. _____

shall also form part of and govern this Agreement.

IN WITNESS HEREOF, the parties hereto have respectively set their signatures in the presence of

WITNESS

1.

2.

WITNESS

1.

2.

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

(For and on behalf of BHEL)

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at BHEL House, Siri Fort, Asiad, New Delhi – 110049 through its Unit at Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot no. 25, Sector – 16 A, Noida - 201301 having agreed to exempt (Name of the Vendor / Contractor / Supplier) with its registered office at _____¹ (hereinafter called the said "Contractor" which term includes supplier), from demand under the terms and conditions of the Contract reference No. _____ dated _____² valued at Rs. ³ (Rupees -----)³ (hereinafter called the said Contract), of Security Deposit for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs. _____⁴ (Rupees _____ only),

We _____ (indicate the name and address of the Bank) having its Head Office at _____ (address of the head Office) (hereinafter referred to as the Bank), at the request of _____ [Contractor(s)], being the Guarantor under this Guarantee, do hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer, an amount not exceeding Rs. _____ without any demur, immediately on demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment.

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) or acceptance of the final bill or discharge of this guarantee by the Employer, whichever is earlier. This guarantee shall initially remain in force upto and including _____⁵ and shall be extended from time to time for such period as may be desired by the Employer. Unless a demand or claim under this guarantee is made on us in writing on or before the _____⁶, we shall be discharged from all the liability under this guarantee thereafter.

We, _____ (indicate the name of the Bank) _____ further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

We,..... Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed..... ⁴

b) This Guarantee shall be valid up to ⁵

c) Unless the Bank is served a written claim or demand on or before ⁶ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

Date _____ Day of _____
for _____ (indicate the name of the Bank) _____

(Signature of Authorised signatory)

- ¹ ADDRESS OF THE VENDOR/ CONTRACTOR/ SUPPLIER.
- ² DETAILS ABOUT THE NOTICE OF AWARD/ CONTRACT REFERENCE
- ³ CONTRACT VALUE
- ⁴ BG AMOUNT IN FIGURES AND WORDS
- ⁵ VALIDITY DATE
- ⁶ DATE OF EXPIRY OF CLAIM PERIOD

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

Note:

1. Bidders are advised that expiry of claim period may be kept 3-6 months after validity date..
2. The BG should be on Non-Judicial Stamp paper/ e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/ e-stamp paper shall be purchased in the name of Vendor/ Contractor/ Supplier/ Bank issuing the guarantee.

3. In Case of Bank Guarantees submitted by Foreign Vendors.

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

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

b.1 In such cases, Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. All charges for issuance of Bank Guarantee/ counter-Guarantee should be borne by the Foreign Vendor.

b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

B.G. No.

Date

This deed of Guarantee made this _____ day of _____ two thousand _____ by < **Name and Address of Bank** > hereinafter called the "The Guarantor" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns) in favour of M/S Bharat Heavy Electricals Limited a Company incorporated under the Companies Act, 1956, having its registered office at BHEL House, Siri Fort, New Delhi - 110049 through its unit at Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot no. 25, Sector - 16 A, Noida - 201301, hereinafter called "The Company" (which expression shall unless repugnant to the context or meaning thereof be deemed to include its successors and assigns).

WHEREAS M/s. _____ (hereinafter referred to as the Contractor) have entered into a Contract arising out of Letter of Intent no. _____ dtd _____ (hereinafter referred to as "the Contract") for the < **Name of work** > with the Company.

AND WHEREAS the Contract inter-alia provides that the Company will pay to the Contractor interest bearing advance of Rs. _____ (Rupees _____ only) on certain terms and conditions specified in the Contract subject to the Contractor furnishing a Bank Guarantee for Rs. _____ (Rupees _____ only) in favour of the Company.

AND WHEREAS the Company has agreed to accept a Bank Guarantee from a Bank to cover the said advance.

AND WHEREAS the Contractor has approached the Guarantor and in consideration of the arrangement arrived at between the Contractor and the Guarantor, the Guarantor has agreed to give the Guarantee as hereinafter mentioned in favour of the Company.

NOW THIS DEED WITNESSES AS FOLLOWS:-

- (1) In consideration of the Company having agreed to advance a sum of Rs. _____ (Rupees _____ only) to the Contractor, the Guarantor do hereby guarantee the due recovery by the Company of the said advance with interest thereon as provided according to the terms and conditions of the Contract. If the said Contractor fails to utilise the said advance for the purpose of the Contract and /or the said advance together with interest as aforesaid is not fully recovered by the Company the Guarantor do hereby unconditionally and irrevocably undertake to pay to the Company without demur and merely on a demand, to the extent of the said sum of Rs. _____ (Rupees _____ only) any claim made by the Company on them for the loss or damage caused to or suffered by the Company by reasons of the Company not being able to recover in full the advance with interest as aforesaid.

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

-
- (2) The decision of the Company whether the Contractor has failed to utilise the said advance or any part thereof for the purpose of the Contract and / or as to the extent of loss or damage caused to or suffered by the Company by reason of the Company not being able to recover in full the said sum of Rs. _____ with interest if any shall be final and binding on the Guarantor, irrespective of the fact whether the Contractor admits or denies the default or questions the correctness of any demand made by the Company in any Court Tribunal or Arbitration proceedings or before any other Authority.
 - (3) The Company shall have the fullest liberty without affecting in any way the liability of the Guarantor under this Guarantee, from time to time to vary any of the terms and conditions of the Contract or extend time of performance by the Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the Contractor and either enforce or forebear from enforcing any of the terms and conditions governing the Contract or securities available to the Company and the Guarantor shall not be released from its liability under these presents by any exercise by the Company of the liberty with reference to the matters aforesaid or by reasons of time being given to the Contractor or any other forbearance, act or commission on the part of the Company or any indulgence by the Company to the Contractor or of any other matter or thing whatsoever which under the law relating to sureties would, but for this provision have the effect of so releasing the Guarantor from its liability under this guarantee.
 - (4) The Guarantor further agrees that the Guarantee herein contained shall remain in full force and effect during the period till the Company discharges this Guarantee, subject to however, that the Company shall have no claim under this Guarantee after _____ i.e. (the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time, as the case may be) unless a notice of the claim under this Guarantee has been served on the Guarantor before the expiry of the said period in which case the same shall be enforceable against the Guarantor notwithstanding the fact that the same is enforced after the expiry of the said period.
 - (5) The Guarantor undertakes not to revoke this Guarantee during the period it is in force except with the previous consent of the Company in writing and agrees that any liquidation or winding up or insolvency or dissolution or any change in the constitution of the Contractor or the Guarantor shall not discharge the Guarantor's liability hereunder.
 - (6) It shall not be necessary for the Company to proceed against the Contractor before proceeding against the Guarantor and the Guarantee herein contained shall be enforceable against them notwithstanding any security which the Company may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealised.
 - (7) Notwithstanding anything contained herein before, our liability under the Guarantee is restricted to Rs. _____ (Rupees _____). Our guarantee shall remain in force until _____, i.e. the present date of validity of Bank Guarantee unless the date of validity of this Bank Guarantee is further extended from time to time. Unless a claim or demand under this guarantee is made against us on or before-----, we shall be discharged from our liabilities under this Guarantee thereafter.

BANK GUARANTEE FOR INTEREST BEARING REFUNDABLE ADVANCE

- (8) Any claim or dispute arising under the terms of this document shall only be enforced or settled in the courts at New Delhi/ Delhi only.
- (9) The Guarantor hereby declares that it has power to execute this Guarantee under its Memorandum and Articles of Association and the executant has full powers to do so on its behalf under the Power of Attorney dated_____ (To be incorporated by the Bank) granted to him by the proper authorities of the Guarantor.

IN WITNESS whereof the _____(Bank) has hereunto set and subscribed its hand the day, month and year first, above written.

(Name of the Bank)

Signed for and on behalf of the Bank
(Designation of the Authorized Person Signing the Guarantee)

(Signatory No.-----)

DATED:

SEAL

=====

Notes :

1. The BG shall be executed on non-judicial stamp papers of adequate value procured in the name of the Bank in the State where the Bank is located.
2. The BG is required to be sent by the executing Bank directly to BHEL at the address where tender is submitted / accepted, under sealed cover.

FORM for EXTENSION OF VALIDITY OF BANK GUARANTEE

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

BANK GUARANTEE No:

Date:.....

To

(Write Designation and Address of Officer of BHEL inviting the Tender)

Dear Sir

Sub : Validity of Bank Guarantee No:..... Dated for
 Rs in favour of yourself, expiry date
, on account of M/s in respect of
 Contract Number....., (herein after called the Original bank Guarantee)

At the request of M/s....., we Bank,
 having its branch Office at and having Head office
 at, do hereby extend our liability under the above mentioned Bank Guarantee
 number..... dated for a further period of Months/years
 from to expire on

Except as provided above, all other terms and conditions of the Original Bank Guarantee No
 Dated..... shall remain unaltered and binding on us.

Kindly treat this extension as an integral part of the original Bank Guarantee to which it
 would be attached.

Yours faithfully

Signature.....

Name & Designation.....

Power of Attorney/Signing Power No

Seal of Bank



PS-

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 1 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART- A: PLAN/ REVIEW OF WORK FOR THE MONTH OF

Date of Plan/ Review.....

SN.	Description of Work	Unit of Measur- ement	Unit Rate	Planned		Cumulative Shortfall attributable to contractor upto last month (Refer Note 1)		Achieved		Shortfall attributable to BHEL w.r.t Plan (as per Col. 3 of Part- D)		Cumulative Shortfall attributable to Contractor upto & including this month		REMARKS (Reasons for Shortfall attributable to Contractor. Supporting documents to be kept as record.)
				(QTY Planned for the month as per Part –C of last month)										
(a)	(b)	(c)	(d)	A		B		C		D		E=A+B-C-D		
				Phy.	Financial	Phy	Financial	Phy.	Financial	Phy.	Financial	Phy.	Financial	
	Value of Other Items not mentioned above but planned to be executed in this month													
Total					ΣA		ΣB		ΣC		ΣD		ΣE	

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

 PS-	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page 2 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART- A: Contd.....

Note 1: In addition to the work planned as per Col. 'A', Contractor shall also make full efforts to minimize the 'Cumulative shortfall attributable to contractor upto the month' as mentioned in Col. 'B' by enhancing its resources, so as to achieve the completion of activities as per agreed schedule. In case contractor is not able to execute the entire shortfall, then BHEL 'Engineer in-charge', shall decide the priority of work to be executed and it shall be binding on the contractor.

Note 2: Percentage Shortfall attributable to contractor w.r.t. "Plan - Shortfall attributable to BHEL" for the month = $[(\Sigma E - \Sigma B) / (\Sigma A - \Sigma D)] \times 100$
 In case, $(\Sigma E - \Sigma B)$ is negative, then it shall be treated as zero percent."

Note 3: Form 14 should include all items being planned in the current month, and all items against which shortfall was attributable to contractor till previous month. However, for practical reason, if it is not possible to mention some of the items in Form-14 being planned to be executed in this month, then also value of such items shall necessarily be included in calculation of Total Value.

Note 4: In case reason for shortfall attributable to contractor is w.r.t. T&P and Manpower, it should be in conformity with Part B1 and B2.

BHEL
 (Sign with name, designation and date)

CONTRACTOR
 (Sign with name, designation and date)



PS-

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 3 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART – B-1: PLAN/REVIEW OF DEPLOYMENT OF MAJOR T&Ps FOR THE MONTH OF

Date of Plan/ Review.....

CONTRACTOR'S SCOPE: -

SN.	PLAN				DEPLOYMENT STATUS			
	Major T&P to be deployed as per work planned for the month	QTY	Deployment Period (in days)	Weightage assigned to planned T&P (in fraction such that $\Sigma C = 1$)	Actual Deployed Quantity	Actual Deployment Period (in days)	Weighted T&P Deployed	REMARKS (Works affected due to non-deployment of T&Ps)
		A	B	C	D	E	$F = (C \times D \times E) / (A \times B)$	

Note: In case, $E > B$, it shall be considered as $E = B$. Similarly, in case $D > A$, it shall be considered as $D = A$.Percentage of T&P Deployed = $\Sigma F \times 100$ **BHEL SCOPE: -**

SN.	PLAN			DEPLOYMENT STATUS		
	Major T&P to be deployed as per work planned for the month	QTY	Deployment Period (in days)	Actual Deployed Quantity	Actual Deployment Period (in days)	REMARKS (Works affected due to non-deployment of T&Ps)

BHEL

(Sign with name, designation and date)

CONTRACTOR

(Sign with name, designation and date)



PS-

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 4 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART – B-2: PLAN/ REVIEW OF DEPLOYMENT OF MANPOWER FOR THE MONTH OF

Date of Plan/ Review.....

CONTRACTOR'S SCOPE: -

SN.	Area of Work	Category of Labour	No. of Labour required as per category	Deployment Period (in days)	No. of Labour actually deployed	Actual Deployment Period (in days)	REMARKS (Works affected due to non-availability of labour)
			A	B	C	D	

$$\text{Percentage of Manpower Deployed} = 100 \times \frac{\sum(C \times D)}{\sum(A \times B)}$$

BHEL

(Sign with name, designation and date)

CONTRACTOR

(Sign with name, designation and date)



PS-

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 5 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART – C: PLAN(PHYSICAL) FOR THE NEXT MONTH i.e.

Date of Plan

SN.	Description of work	Original Planned Quantity	Planned Quantity (excluding shortfalls attributable to contractor till date)	Unit of Measurement	T&Ps Required				Manpower Required		REMARKS (Reasons for difference in Original Planned Quantity w.r.t. Planned quantity to be given)
					Contractor Scope		BHEL Scope		Category of Labour	No. of Labour required as per Category	
					Major T&P to be deployed as per work planned for the month	Quantity	Major T&P to be deployed as per work planned for the month	Quantity			

Note 1: Planned quantity should be based on available/ expected fronts/ inputs in the next month

Note 2: “Original Planned Quantity” shall be as per latest jointly agreed programme between BHEL and Contractor before commencement of work or at the time of latest Time Extension, as the case may be.

BHEL

(Sign with name, designation and date)

CONTRACTOR

(Sign with name, designation and date)



PS-

MONTHLY PLAN & REVIEW WITH CONTRACTOR

Page 6 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART – D: REASONS FOR SHORTFALL ATTRIBUTABLE TO BHEL IN RESPECT OF PLAN FOR THE MONTH.....

SN.	Description of Work (from Part-A)	Quantities Affected		Reasons for Shortfall attributable to BHEL	Agency responsible for reasons for Shortfall	Remarks (Supporting Documents in respect of agency responsible)
		(Physical Quantity)	Unit of Measu- rement			
1	2	3	4	5	6	7

Note1: Reasons for shortfall shall include non-availability of fronts/ drawings/ materials/ T&P (BHEL Scope)/ clearances etc. and other hindrances for which contractor is not responsible.

Note2: Agency responsible may be BHEL Site/ MUs/ Design Centre/ BHEL Customer/ other Contractors etc.

BHEL

(Sign with name, designation and date)

Project		Vendor			Package/Unit	
Sl. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#1.01	Cumulative number of days in the month, the nominated Quality Officer or his authorised nominee was not available	QUALITY	1.5		Quality Officer or his authorised nominee should be available for all the days of working at site	Daily Log Book entry/Incident Registers/letter references
#1.02	Number of instances of non- compliance wrt FQP, Standard Drawings, Specifications, E&C Manuals etc.	QUALITY	1.5		No deviation from FQP, Standard Drawings, Specifications, E&C Manuals etc. is allowed without BHEL Engineer's approval.	Daily Log Book entry/Incident Registers/letter references
#1.03	Percentage submission of test certificates for batches of welding electrodes, cement, sand, aggregate, consumable, Paints etc. as applicable for this month OR In case of MM & MH package, monthly checks for Storage/Preservation of material.	QUALITY	1		Submission of 100% Test certificates for materials as per FQP is mandatory. MM & MH package: Storage/Preservation as per manual/procedure.	Daily Log Book entry/Incident Registers/letter references
#1.04	Number of incidences of improper storage & preservation (not in accordance to the guidelines of BHEL MUs or approved FQP) of materials, consumables (viz. gases, welding electrodes & fluxes, fuel etc.) & bought-out items (paints, fasteners etc.) under the custody of the contractor	QUALITY	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#1.05	Rework/ Rejection instances in a month necessitated due to deviation from Standard Drawings /Specifications /Manuals /E&C procedures /FQPs or due to Poor Workmanship by contractor	QUALITY	2		Reworks/ Rejection should be as minimum as possible. Total number of reworks/ rejections due to reasons attributable to contractor.	Daily Log Book entry/Incident Registers/letter references
#1.06	Delay in preparation & submission of signed protocols / log sheets / site register / NDT test reports as per approved FQP/ Qualified Welder List along with photocopies of Welder ID cards / Welder Performance Evaluation records etc. in the month OR in case of MM / MH package reconciliation statement / verification report.	QUALITY	1		Within 2 days of measurements taken or within first 3 working days of next month, as advised by BHEL Engineer	Daily Log Book entry/Incident Registers/letter references
#1.07	Number of instances for Major equipment/product failure due to negligence/improper work/poor workmanship by contractor	QUALITY	1		No such event should happen	Daily Log Book entry/Incident Registers/letter references
#1.08	Total number of complaints received in the month on the quality of finish / aesthetics	QUALITY	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
Sl. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#2.01	Cumulative number of days of delay in submission of Plan FOR THE MONTH supported by deployment plan of Major T&Ps and Manpower (as per Form F-14) and relevant construction/layout drawings - like A4 plan / elevation views of plan status for structures / pressure parts/Civil Works, Piping isometrics for piping, Layout / PID / System reference sketch, Unloading / storage plans etc.as applicable.	PERFORMANCE	5		Number of days delayed from second working day of the month	Daily Log Book entry/Incident Registers/letter references
#2.02	Percentage of timely submission of Daily Reports for Progress of work, Resources, Consumables etc.	PERFORMANCE	1.5		Percentage of timely submission of daily reports/ Scheduled date is successive next day for each day	Daily Log Book entry/Incident Registers/letter references
#2.03	Number of days delayed for submission of FQP log sheets / protocols / Monthly Progress Reports for the work executed during the month under measurement	PERFORMANCE	1.5		Number of days delayed/Scheduled date is first 2 working days of next month	Daily Log Book entry/Incident Registers/letter references
#2.04	Percentage Shortfall attributable to contractor w.r.t. "Plan - Shortfall attributable to BHEL" for the month as per Form-14	PERFORMANCE	35		As per Part-A of Form-14	Progress review formats
#2.05	Number of days delayed in submission of Running bills with complete supporting documents (including updated reconciliation statement of BHEL issued material) for the month	PERFORMANCE	2		Number of days delayed / Scheduled date is 7th day of next month	Daily Log Book entry/Incident Registers/letter references
#2.06	Number of times the Top Management of contractor did not respond to critical issues of site, for the month	PERFORMANCE	1		Total number of instances	Daily Log Book entry/Incident Registers/letter references
#2.07	Cumulative number of days in the month the works were stopped / refused on interpretation of contract clauses/scope due to tendency of taking undue advantage by interpreting contract clauses in their favour	PERFORMANCE	2		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#2.08	Number of times rework was refused by contractor	PERFORMANCE	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#2.09	Cumulative number of days in the month recording / logging was not done in daily log / history register / hindrance register / soft form in a PC maintained at BHEL Site Office	PERFORMANCE	1		Cumulative number of days recording or logging was not done / all days of the month	Daily Log Book entry/Incident Registers/letter references

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
Sl. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#3.01	Percentage of Manpower Deployed w.r.t. Plan for the month as per Form-14.	RESOURCES	7		As per Part-B2 of Form-14	Daily Log Book entry/Incident Registers/letter references
#3.02	Percentage of T&P Deployed w.r.t. Plan for the month as per Form-14.	RESOURCES	7		As per Part-B1 of Form-14	Daily Log Book entry/Incident Registers/letter references
#3.03	Cumulative number of major instances in the month hampering / affecting progress of work due to breakdown or non-availability of major T&P and MME for the work, under the scope of Contractor	RESOURCES	3		Cumulative number of instances	Daily Log Book entry/Incident Registers/letter references
#3.04	Cumulative number of major instances in the month hampering / affecting progress of work due to non-availability of Consumables/ use of improper consumables under the scope of contractor	RESOURCES	3		Cumulative number of instances	Daily Log Book entry/Incident Registers/letter references
#4.01	Number of non-compliances during the month for Statutory requirements like validity of Labour Licence, Insurance Policy, Labour Insurance, PF, BOCW Compliance etc. and any other applicable laws/ Regulation, Electrical Licence, T&P fitness certificate, Contractors' All Risk Policy etc. as applicable	SITE INFRASTRUCTURE & SERVICE	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#4.02	Cumulative number of days in a month poor illumination is reported at storage area, erection area, pre-assembly area and other designated areas by BHEL site.	SITE INFRASTRUCTURE & SERVICE	0.5		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.03	Cumulative number of days of non-availability of well-maintained toilets facilities for workers (separate for men and women) and non-availability of potable drinking water stations for workers in specified areas.	SITE INFRASTRUCTURE & SERVICE	1		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
Sl. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#4.04	Total number of instances in the month, Housekeeping NOT attended to in spite of instructions by BHEL -i.e. removal / disposal of surplus earth / debris / scrap / unused / surplus cable drums / other electrical items / surplus steel items / packing materials, thrown out scrap like weld butts, cotton waste etc. from the working area to identified locations	SITE INFRASTRUCTURE & SERVICE	2		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.05	Total number of instances in a month, Site Office with reasonably good facilities including enough nos. of computers and printers etc. for use by office and supporting staff was not made available/maintained.	SITE INFRASTRUCTURE & SERVICE	0.5		No discrepancy during regular or surprise visits	Photograph and report of the Engineer
#5.01	Number of days delayed in making labour payments for the last month	SITE FINANCE	2		Number of days delayed / Scheduled date is 7th day of next month	Daily Log Book entry/Incident Registers/letter references
#5.02	Number of complaints from labour/ sub supplier/ sub-contractor for non-receipt of payments from contractor	SITE FINANCE	1.5		Total number of complaints or reporting	Daily Log Book entry/Incident Registers/letter references
#5.03	Number of times the site operations were hampered for want of funds at the disposal of site-in-charge.	SITE FINANCE	1.5		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#6.01	Cumulative number of days in a month the nominated Safety Officer was not available	HSE & SA	1		Safety Officer should be available for all the days	Daily Log Book entry/Incident Registers/letter references
#6.02	Shortfall in number of weekly safety meetings in the month conducted or attended by the Safety Officer	HSE & SA	0.5		Safety meetings to be held every week	Copy of Minutes of meeting
#6.03	Level of compliance w.r.t decisions taken in previous Safety meetings	HSE & SA	0.5		Number of consolidated issues discussed in Safety meetings	Copy of Minutes of meeting, Non-compliance intimation documents from BHEL site
#6.04	Delay in submission of monthly report on safety (including electrical safety for equipment & personnel etc.) in the prescribed form	HSE & SA	1		Number of days delayed/Scheduled date is third working day of next month	Daily Log Book entry/Incident Registers/letter references
#6.05	Number of days taken for lodging FIRs from date of occurrence/notice of incident of theft / accident etc.	HSE & SA	0.5		Number of days delayed/Scheduled date is within 24 Hrs of occurrence/notice of incidence	Copy of FIR lodged by Contractor

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
Sl. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
#6.06	Number of times written(email, letters etc.) warning issued for non-availability/ use of improper Fall protection and rescue arrangement as lifeline, fall arrestors, safety net, hand-railings, covered floors, man-basket, rescue basket & kit etc. by the contractor	HSE & SA	2		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#6.07	Number of times punitive fines imposed for unsafe practices as per contract like non-availability/use of PPEs as safety shoes, helmets, goggles, gloves, lifeline, safety belts etc.	HSE & SA	1		Total number of non-compliances	Non-compliance intimation documents from BHEL site
#6.08	Percentage compliance to Emergency preparedness and response plan: Portable Fire-extinguishers, Buckets, Fire-wardens, display of emergency numbers, mock-drills, Hazard Identification and Risk Assessment(HIRA) etc.	HSE & SA	1		Compliance should be 100% as per HSE Plan or as finalized in Safety Meetings	Non-compliance intimation documents from BHEL site
#6.09	Number of times the agency has defaulted on display of safety posters / safety slogans / safety barriers/emergency numbers etc. in identified areas	HSE & SA	0.5		Total number of instances	Non-compliance intimation documents from BHEL site
#6.10	Non compliances observed during HSE and Safety Audit	HSE & SA	0.5		Total number of non-compliances	Non-compliance intimation documents from BHEL site, Audit Reports
#6.11	Cumulative number of days in the month, non-availability of First Aid Kit, First Aider & Emergency Vehicles/Ambulance.	HSE & SA	0.5		Cumulative number of days	Non-compliance intimation documents from BHEL site
#6.12	Number of days taken for submission of Root Cause analysis (RCA) for the accident from the cut-off date intimated by BHEL for submission of RCA	HSE & SA	0.5		Number of days delayed/Scheduled date is cut-off date intimated by BHEL	Daily Log Book entry/Incident Registers/letter references
#6.13	Non conductance of training (induction, job specific, height work etc.), tool box meeting and health check-up as per Contract requirements	HSE & SA	0.5		Number of incidences of non-conductance during the month	Daily Log Book entry/Incident Registers/letter references
Total			100			

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
Sl. No.	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents
	Less Deduction in Score Due to Major Accidents (Fatal, Permanent Disability or bodily injury by which person injured is prevented to resume to work within 48 hours or more after accident,, Major Damage to Equipment etc.) attributable to the contractor @ 3 points/ accident					
	Less Deduction in Score Due to Minor Accidents attributable to the contractor @ 1 point/ accident					
	Less Deduction in Score Due to not Maintaining of Labour Colony (if applicable) as per BHEL HSE policy @2 points in a month on verification any day					
	Final Score					

Performance Score Summary for the Month	Total Score	Score Obtained
QUALITY	10	
PERFORMANCE	50	
RESOURCES	20	
SITE INFRASTRUCTURE & SERVICE	5	
SITE FINANCE	5	
HSE & SA	10	
OTHERS (deductions if any)	0	
TOTAL	100	

Note:

- 1) It is only indicative and shall be as per the online format issued by BHEL time to time.
- 2) No request will be entertained after specified date of current month w.r.t. changes requested in the scores of immediate previous month.

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

MILESTONE COMPLETION CERTIFICATE
(issued by BHEL on the specific request of Contractor)

Ref :

Date:

To,

(Name & address of Contractor)

Dear Sir,

References

1. Contract No:
2. Job Description:

This is to hereby confirm that the following Milestone Activity has been achieved in respect of the Contract /Job under reference

Sl No	Milestone Activity	Remarks

This certificate is issued as per your request vide letter no
without any prejudice to the rights of BHEL in line with the terms and conditions of the
above referred Contract

Yours faithfully,

For and on behalf of Bharat Heavy Electricals Limited

Construction Manager/Head (Subcontracts)

CONTRACT COMPLETION CERTIFICATE
(Issued by BHEL/HQ on the specific request of Contractor)

Ref :

Date:

To Whom so ever it may concern

1	DESCRIPTION OF WORK	
2	NAME AND ADDRESS OF THE CONTRACTOR	
3	CONTRACT NO	
4	CONTRACT VALUE	
5	LETTER OF INTENT/ AWARD NO. & DATE	
6	CONTRACT PERIOD//CONTRACT DURATION	
7	DATE OF START/COMPLETION	
8	FINAL EXECUTED VALUE	
9	PERFORMANCE	GOOD SATISFACTORY UNSATISFACTORY

This certificate is issued as per your request vide letter no
without any prejudice to the rights of BHEL to use this certificate for evaluation of your offers for future tenders

Yours faithfully,

For and on behalf of Bharat Heavy Electricals Limited

Head (Subcontracts)

INDEMNITY BOND

(To be executed on a Non Judicial Stamp Paper of the requisite value as per Stamp Duty prevalent in the respective State)

 This Indemnity Bond executed by <name of company> having their Registered Office at <xxxxxxxxxx> in favour of M/s Bharat Heavy Electricals Limited, a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort, Asiad, New Delhi - 110049 through its Unit at Power Sector-_____ Region, _____, _____ State. (Hereinafter referred to as the Company)

And whereas the Company has entered into a Contract with M/s xxxxxxxxx, the executants of this Deed (hereinafter referred to as the Contractor) as its contractor in respect of the work of "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx".

AND WHEREAS under the provisions of GCC further stipulates that the Contractor shall indemnify the Company against all claims of whatever nature arising during the course of execution of Contract including defects liability period of <xx Months > i.e till <xx xx xxxx>

Now this deed witness that in case the Company is made liable by any Authority including Court to pay any claim or compensation etc. in respect of all labourers or other matters at any stage under or relating to the Contract with the Contractor, the Contractor hereby covenants and agrees with the Company that they shall indemnify and reimburse the Company to the extent of such payments and for any fee, including litigation charges, lawyers' fees, etc, penalty or damages claimed against the Company by reason of the Contractor falling to comply with Central/States Laws, Rules etc, or his failure to comply with Contract (including all expenses and charges incurred by the Company).

The Contractor further indemnifies the Company for the amount which the Company may be liable to pay by way of penalty for not making deductions from the Bills of the Contractor towards such amount and depositing the same in the Government Treasury.

INDEMNITY BOND

(To be executed on a Non Judicial Stamp Paper of the requisite value as per Stamp Duty prevalent in the respective State)

The Contractor further agree that the Company shall be entitled to with hold and adjust the Security Deposit and/or with hold and adjust payment of Bills of Contractor pertaining to this Contract against any payment which the Company has made or is required to make for which the Contractor is liable under the Contract and that such amount can be withheld, adjusted by the Company till satisfactory and final settlement of all pending matters and the Contractor hereby gives his consent for the same.

The Contractor further agrees that the terms of indemnity shall survive the termination or completion of this contract.

The contractor further agrees that the liability of the contractor shall be extended on actual basis notwithstanding the limitations of liability clause, in respect of :

1. breach of terms of contract by the contractor
2. breach of laws by the contractor
3. breach of Intellectual property rights by the contractor
4. breach of confidentiality by the contractor

Nothing contained in this deed, shall be construed as absolving or limiting the liability of the Contractor under said Contract between the Company and the Contractor. That this Indemnity Bond is irrevocable and the condition of the bond is that the Contractor shall duly and punctually comply with the terms and the conditions of this deed and contractual provisions to the satisfaction of the Company.

In witness where of M/s xxxxxxxxxxxxxx these presents on the day, month and year first, above written at xxxxxxxx by the hand of its signatory Mr. xxxxxxxxxxxx.

Signed for and on behalf of
M/s xxxxxxxxxxxxxxxx

Witness:

1
2

CONSORTIUM AGREEMENT

(To be executed on Rs. 50/- Non – Judicial Stamp Paper)

THIS AGREEMENT is made and executed on this _____ day of _____, by and between (1) M/s _____, (The First Party, i.e, the Bidder) a company incorporated under the Company's Act 1956, having its registered office at _____ (herein after called the "Bidder", which expression shall include its' successors, administrators, executors and permitted assigns) and (2) M/s _____, (The Second Party, i.e, the associates), a company incorporated under the Company's Act 1956, having its registered office at _____ (herein after called the " Associates", which expression shall include its' successors, administrators, executors and permitted assigns).

WHEAEAS the Owner, Bharat Heavy Electricals Ltd, a Government of India Undertaking, proposes to issue / issued an NIT (herein after referred to as the said NIT) inviting bids from the individual Bidders for undertaking the work of _____, at _____ (herein after referred to as the said works).

WHEREAS the said NIT enables submission of a bid by a Consortium subject to fulfillment of the stipulations specified in the said NIT.

AND WHEREAS M/s _____ (The First Party, i.e, the Bidder) will submit its proposal in response to the aforesaid invitation to bid by the Owner for _____ as detailed in the Bid doc. no. < TENDER REF----->

AND WHEREAS M/s _____ (The First Party, i.e the Bidder) itself is meeting all the qualifying requirements except the qualifying requirements of _____ (as detailed in the NIT) and in order to fully meet the qualifying requirements of NIT, this tie-up agreement is being entered into with M/s _____ (The Second Party, the Associates) , who fully meet the balance part of the said works (_____).

WHEREAS the First Party and the Second Party are contractors engaged in the business of carrying out various items of works. WHEREAS the two parties have agreed to constitute themselves into a consortium for the purpose of carrying out the said works, and that the consortium will be continued till the completion of the works in all respects.

WHEREAS the parties have agreed to certain terms and conditions in this regard:

CONSORTIUM AGREEMENT

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS :

1. First and Second parties hereby constitute themselves into a Consortium for the purpose of bidding and undertaking the said works pursuant to the said NIT as hereinafter stated.
2. The First Party will be the leader (Lead Partner) and will be responsible for the entire works.

CONSORTIUM AGREEMENT

3. The First Party shall undertake the following part(s) of work detailed in the NIT namely _____

4. The Second Party shall undertake the following part(s) of work detailed in the said NIT namely _____

5. The parties hereby declare and confirm that each of them will fulfill the required minimum qualifying requirements as prescribed in the said NIT for the works agreed to be undertaken by them as stated here-in-above.
6. It is also agreed between the parties hereto that all of them shall be individually and severally responsible for the completion of the said works as per the schedule. Further, if the Employer/Owner sustains any loss or damage on account of any breach of the Contracts, we the, Consortium partners individually and severally undertake to promptly indemnify and pay such losses / damages caused to the Employer/Owner on its written demand without any demur, reservation, contest or protest in any manner whatsoever.
7. The parties hereby agree and undertake that they shall provide adequate finances, suitable Tools, Plants, Tractors, Trailers, other transportation equipment, other Tools & Plants, Measuring & Monitoring Equipments (MMEs), Men and Machinery etc. for the proper and effective execution of the works to be undertaken by them as specified here-in-above.
8. It is agreed interse between the parties hereto that all the consequences liabilities etc., arising out of any default in the due execution of the said works shall be borne by the party in default, that is by party in whose area of works default has occurred, provided however, so far as M/s Bharat Heavy Electricals Limited is concerned, all the parties shall be liable jointly and severally.

CONSORTIUM AGREEMENT

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

WITNESS

For

1. NAME
2. OFFICIAL ADDRESS

(FIRST PARTY)

WITNESS

For

1. NAME
2. OFFICIAL ADDRESS

(SECOND PARTY)

[The successful bidder shall have to execute the " JOINT DEED OF UNDERTAKING " in the format to be made available by BHEL at the time of awarding].

BHARAT HEAVY ELECTRICALS LIMITED

DIVISION.....

Claim for Refund of Security Deposit
(Para 4.7.4 of Works Accounts Manual)

Ref No.:

Date:

- 1 Name and address of the contractor
- 2 Contract Agreement/Work Order No.
- 3 Date of contract agreement/work order
- 4 Name of the work undertaken
- 5 Date of commencement of the work
- 6 Date of completion of the work
- 7 Period of Maintenance
- 8 Date on which the final bill was paid
- 9 Last date of making good the defect, if any, during maintenance period
- 10 Expenditure incurred by BHEL during maintenance period, if any, recoverable
- 11 Date on which security deposit refund falls due as per contract

- 12 Amount deposited/recovered

Details	Mode	Amount

- 13 LESS amounts recoverable (with details)

- (i) Amount spent by BHEL on maintenance :
- (ii) Payments made on behalf of contractor :
- (iii) Court dues / penalties / compensation :
- (iv) Other recoveries for services etc. :
- (v) Security deposit released with final bill (%) :

- 14 Net amount recommended for release (12-13)

Details	Mode	Amount

Date:

Signature of Engineer in Charge

CERTIFICATE TO BE FURNISHED BY THE CONTRACTOR

I/We have no claim or demand outstanding against BHEL for the work done or for labor or material supplied or any other account arising out of or connected with the contract agreement/work order (No.....dated) and the payment of this bill shall be in full and final

Date:

Signature of Contractor

CERTIFICATE TO BE FURNISHED BY SENIOR ENGINEER

Certified that

– The payment recommended for release is in order and there are no demands other than those included in the claim outstanding from the contractor;

The maintenance period as per the contract agreement is over and the contractor has carried out the works required to be carried out by him during
– the period of maintenance to our satisfaction, and all expenses incurred by the company on carrying out such works have been included for adjustment;

– All the objections raised so far have been settled;

– A note of refund of security deposit has been made in the measurement book and contract agreement/work order.

Date:

Signature of Senior Engineer

FOR USE IN FINANCE DEPARTMENT

Passed for

Rs.....(Rupees.....
.....only)

Accountant

Accounts Officer

REFUND OF GUARANTEE MONEY

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR, _____ REGION

Ref No:

Date:

1. Name and Address of Contractor :
2. Contract Agreement/LOI/ LOA No. :
3. Date of Contract Agreement/LOI/ LOA :
4. Name of the Work undertaken :
5. Date of commencement of the Work :
6. Date of Completion of the Work :
7. Period of Maintenance :
(Guarantee Period)
8. Date on which the Final Bill was paid :
9. Last date of making good the defect :
during Maintenance Period
10. Expenditure incurred by BHEL during :
Maintenance Period, if any, recoverable
11. Date on which Guarantee Money refund:
falls due as per Contract
12. Amount of Guarantee Money to be refunded:
13. Less Amounts recoverable (with details)
 - a. Amount spent by BHEL on maintenance :
 - b. Payments made by BHEL on behalf of Contractor:
 - c. Court dues/penalties/compensation :
 - d. Other recoveries for Services, etc :
 - e. Total of 'a' to 'd' :
14. Net Amount recommended for release (12-13) :

Signature of BHEL Engineer

Date: _____

REFUND OF GUARANTEE MONEY

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR, _____ REGION

CERTIFICATE TO BE FURNISHED BY THE CONTRACTOR

I/We have no claim or demand outstanding against BHEL _____, for the work done or for labour or material supplied or any other account arising out of or connected with the Contract Agreement/LOI/ LOA (No _____ dated _____) and the payment of this bill shall be in full and final settlement of all my/our claims and demands including the 'Deposits' of the Contract Agreement/LOI/ LOA referred to.

Signature of Contractor

Date:

CERTIFICATE TO BE FURNISHED BY SENIOR ENGINEER/CONSTRUCTION MANAGER

1. Certified that
 - a. The payment recommended for release is in order and there are no demands other than those included in the claim outstanding from the Contractor
 - b. Maintenance period (Contract Guarantee period) is over and the Contractor has carried out the works required to be carried out by him during the period of maintenance (Guarantee) to our satisfaction, and all expenses incurred by the Company on carrying out such works have been included for adjustment
 - c. All objections raised so far have been settled
 - d. A note for refund of Guarantee Amount has been made in the Measurement Book and Contract Agreement/Work Order

Signature of BHEL Engineer

Construction Manager

Date:-----

FOR USE IN ACCOUNTS DEPARTMENT

Passed for Rs _____ (Rupees _____ only)

Accountant

Accounts Officer

ACKNOWLEDGE BY THE CONTRACTOR

Received Rs _____ in full and final settlement of my/our claim

Signature of Contractor

Date:

**POWER OF ATTORNEY for SUBMISSION OF TENDER/SIGNING CONTRACT
AGREEMENT (To be typed on non-judicial stamp paper of minimum Rs. 100/- and
Notarized)**

KNOW ALL MEN BY THESE PRESENTS, that I/We do hereby make, nominate, constitute and appoint Mr , whose signature given below herewith to be true and lawful Attorney of M/s..... hereinafter called 'Company', for submitting Tender/entering into Contract and inter alia, sign, execute all papers and to do necessary lawful acts on behalf of Company with M/s Bharat Heavy Electricals Ltd, Power Sector _____ Region, _____, in connection with
.....
.....
..... vide Tender Specification No : _____, dated _____.

And the Company do hereby agree to ratify and confirm all acts, deeds, things or proceedings as may be lawfully done by the said attorney and by or on behalf of the company and in the name of the company, by virtue of the powers conferred herein and the same shall be binding on the company and shall have full force and effect.

IN WITNESS WHEREOF the common seal of the company has been hereunto affixed in the manner hereinafter appearing on the document.

Dated at _____, this _____ day of _____

Director/CMD/Partner/Proprietor

Signature of Mr.....(Attorney)

Attested by: Director/CMD/Partner/Proprietor

Witness

Notary Public

ANALYSIS OF UNIT RATES QUOTED

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

Offer Reference No:.....

Date:.....

To,

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

Dear Sir,

Sub : Analysis of Unit Rates Quoted

Ref : Tender Specification No:

Analysis of Unit Rates quoted by us in respect of above Tender is as detailed

SN	DESCRIPTION	% OF QUOTED RATE	REMARKS
01	SITE FACILITIES VIZ., ELECTRICITY, WATER OTHER INFRASTRUCTURE.		
02	SALARY AND WAGES + RETRENCHMENT BENEFITS		
03	CONSUMABLES		
04	T&P DEPRECIATION & MAINTENANCE		
05	ESTABLISHMENT & ADMINISTRATIVE EXPENSES		
06	OVERHEADS		
07	PROFIT		
	TOTAL	100%	

Yours faithfully,

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

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION.....
Running Account Bill
(Para 4.3.1 of Works Accounts Manual)

Name of the Contractor

Name of the Work:

Sanctioned Estimate:

Code No.:

Contract Agreement No.:

Dated:

Division:

Date of written order to
commence the Work:

Date of commencement
of work:

Due date of completion as per
agreement

Date of approval of Competent Authority for time extension as applicable
(copy to be enclosed).

Departmental Bill No.

Date:

Sub-Division:

Period of work covered in this
bill:

I. ACCOUNT OF WORK EXECUTED

Adhoc payment for work not previously measured **			Item No. of work	Description of work	Quantity as per agreement	Quantity executed upto date	Rate	Unit	Payment on the basis of actual measurement upto date	Quantity executed since last RA bill	Payment on the basis of actual measurement since last running account bill	Remarks
Total as per last running account bill	Since last running account bill	Total upto date										
1	2	3	4	5	6	7	8	9	10	11	12	13

** 1. Whenever payment is made on adhoc basis without actual measurements the amount in whole rupees should be entered in columns 1 to 3 only and not in columns 7 to 12
2. Whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total upto date in column 3 may become nil.

Total value of work done upto date (A) -----

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

Net value of work done since last Running Account Bill (C) -----

Rupees (in words) Only

Note :
Wherever adhoc payments to contractors against running bills are made in accordance with the extant Works Policy, the amount so paid shall be adjusted.

II. MEMORANDUM OF PAYMENTS

		I	II
1.	Total value of work actually measured as per Account No. I, Column 10	(A) -----	-----
2.	Total upto date adhoc payment for work covered by approximate or plan measurements as per Account I, Col. 3	(B) -----	-----
4.	Total upto date payments [(A)+(B)]	(C) -----	-----
	Total amount of payments already made as per entry (D) of last Running Account Bill No. dated forwarded to the Accounts Department on	(D) -----	-----
6.	Balance [(C) - (D)]		-----
7.	Payments now to be made:	-----	
	a) by cash / cheque	-----	
	b) by deduction for value of materials supplied by BHEL vide Annexure A attached	-----	
	c) by deduction for hire of tools and plant vide Annexure B attached	-----	
	d) by deduction for other charges vide Annexure C attached	-----	
	e) by deduction on account of security deposit	-----	
	f) by deduction on account of Income Tax	-----	-----

Note : Amounts relating to items 4 to 6 above should be entered in column II and those relating to item 7 in column I. The amount shown against item 6 and the total of item 7 should agree with each other.

III. CERTIFICATE OF THE ENGINEER IN CHARGE

1	The measurements on which the entries in column 7 to 12 of Part I of this Bill (Account of work executed) are based were made by ----- and are reorded at pages - ----- of Measurement Book No. ----- (Name and Designation)
2	Certified that the methods of measurement are correct and the work has been carried out in accordance with the terms and conditions, schedules, specifications and drawings etc. forming part of the contract agreement, subject to deviations included in the deviation statement (Annexure D)
3	Certified that in addition to and quite apart from the quantities of work actually executed as shown in column 10 of Part I, some work has actually been done in connection with several items and the value of the such work is, in no case, less than the adhoc payments as per column 3 of Part I, made or proposed to be made, for the convenience of the contractor in anticipation of, and subject to the results of, detailed measurement which will be made as soon as possible.
4	Certified that measurements by Engineer-incharge and test check of prescribed percentage of measurements by the concerned superior authorities has been carried out.
5	Certified that there are no pending recoveries from the contractor on account of chargeable items (e.g T&P, consumables, material, etc.) issued either by BHEL or by the customer and other recoveries like power, water, quarter, tax liability towards declaration forms etc.
6	Certified that with regard to the free issues, regular reconciliation is being done, completed upto ----- and there are no recoveries pending from the contractor on account of such issues in excess of requirement for execution of work as per contract.
7	Certified that there is no pending recovery for damaged material issued free of cost.
8	Certified that the contractor has fulfilled all the requirements as per contract with reference to statutory obligations (PF, ESI, Minimum Wages, BOCW, Insurance etc.), support services such as service manpower, computer system , T&P etc

Signature of Contractor

Signature of Engineer in Charge

Designation:

Date:

Date:

IV. CERTIFICATE OF THE SENIOR ENGINEER

1	Certified that the measurements have been check measured to the prescribed extent by at site and also by the undersigned and the relevant entries have been initialed in the Measurement Book. (vide pages) (Name and Designation)
2	Certified that all the measurements recorded in the measurement book have been correctly billed for
3	Certified that all recoverable amounts in respect of materials tools and plant etc. and other charges have been correctly made vide annexures A to C attached.

Certified for payment * of Rs. (Rupees only)

* Here specify the net amount payable.

Date:

Signature of Senior Engineer

V. ENTRIES TO BE MADE IN THE FINANCE DEPARTMENT

Accounts Bill No. dated

Entered in Journal Book vide entry No. dated

Passed for Rs.

Less Deductions Rs.

Net amount payable Rs.

(Rupees only)

Payable to Shri / M/s by cheque / cash

Entered in Contractors ledger No. Page

Estimate No :

Debit

Credit

(Gross amount)

(Deductions)

Name of Work :

Account code head

Total

Code No.:

ALLOCATION

Assistant

Date:

Accountant

Date:

Finance Executive

Date:

ANNEXURE A

Statement showing details of materials issued to the contractor Shri / M/S..... in respect of Contract Agreement / Work Order No.....Dated..... and covered by the agreement

Sl.No.	Stores Issue Voucher No. and date	Issue voucher No. and date allotted by stores to the SIV	Description of material issued issued to the contractor	Quantity issued		Quantity actually incorporated in the work	Balance quantity with contractor		If recoverable from the contractor				
				Free	Chargeable		Free	Chargeable	Rate at which recoverable	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Total

Certified that (balance quantity of free issue material as per Col. 8 above) is physically available with the Contractor.

Signature of Contractor

Date:

Signature of Engineer in Charge

Date:

Signature of Senior Engineer

Date:

ANNEXURE B

Statement showing tools and plant issued to the contractor Shri/M/s..... in respect of Contract Agreement No.....Dated.....

Sl. No.	Description of Tools and Plant Issued	Period for which issued	Rate at which recovery is to be made	Amount recoverable	Amount recovered upto previous bill	Balance Recovered now	Remarks
1	2	3	4	5	6	7	8

TOTAL

Signature of Contractor

Date :

Signature of Engineer in Charge

Date :

Signature of Senior Engineer

Date:

ANNEXURE C

Form WAM 6 (Contd.)

Statement showing details of other recoveries to be made from the contractor Shri/M/s-----in respect of contract Agreement No. Dated

S. No.	Particulars	Unit	Quantity	Rate	Amount recoverable	Amount recovered up to previous bill	Amount now recovered	Remarks
1	2	3	4	5	6	7	8	9
1	Water charges							
2	Electricity charges							
3	Seignorage charges							
4	Medical charges							
5	Cost of empty gunny bags and empty containers not returned							
6								
7								
8								

TOTAL

Signature of Contractor

Date :

Signature of Engineer in Charge

Date :

Signature of Senior Engineer

Date:

ANNEXURE D
DEVIATION STATEMENT

Name of the Contractor:

Contract Agreement No

Name of Work:

Date:

S. No.	Description of Item	Unit	Quantity as per agreement	Quantity as executed	Quantity further anticipated	Total quantity anticipated on completion	Rate as per agreement	Rate as executed	Amount as per agreement	Amount as executed	Amount further anticipated	Total Amount anticipated on completion	Difference		Reason for deviation with authority, if any
													Excess	Savings	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Signature of Engineer in Charge

Date :

Signature of Senior Engineer

Date :

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION.....
.....And Final Bill
(Para 4.3.2 of Works Accounts Manual)

Departmental Bill No:

Date:

Name of the Contractor:

Name of the Work:

Division:

Date of Written order to commence the work:

Sub-Division:

Sanctioned Estimate:

Contract Agreement/ Work Order No:

Date of actual completion of the work:

Date of commencement of the Work:

Dated:

Due date of completion as per Agreement:

I. ACCOUNT OF WORK EXECUTED

Adhoc payment for work not previously measured **			Item no. of the agreement / work order	Description of work	Quantity as per agreement	Quantity executed upto date	Rate	Unit	Payment on the basis of actual measurement upto date	Quantity since last running account bill	Payment on the basis of actual measurement since last running account bill	Remarks
Total as per last running account bill	Since last running account bill	Total upto date										
1	2	3	4	5	6	7	8	9	10	11	12	13

** Whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total upto date in column 3 may become nil.

Total value of work done upto date (A) -----

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

Net value of work done since last Running Account Bill (C) -----

Rupees (in words) Only

I/ We hereby certify that I/We have performed the work as per the terms and conditions of Contract Agreement/Work Order No.....Dated.....for which payment is claimed as above and that I/We have no further claim under this agreement/work order.

Date:

III CERTIFICATE OF THE ENGINEER IN CHARGE

Designation:

IV CERTIFICATE OF THE SENIOR ENGINEER

1. Certified that I have personally inspected the work and that the work has been physically completed on the due date in accordance with the terms and conditions, schedules, specifications and drawings etc., forming part of the contract agreement, subject to the deviations noted in Deviation Statement (Annexure D).
2. Certified that the measurements have been check measured to the prescribed extent by..... and by the undersigned at site and the relevant entries have been initiated in the measurement book (vide pages.....) (Name and Designation)
3. Certified that the methods of measurement are correct.
4. Certified that the measurements have been technically checked with reference to contract drawings, deviations etc.
5. Certified that the measurements recorded in the measurement book have been correctly billed for at the contract rates or approved rates.
6. Certified that all recoverable amounts in respect of stores, tools and plant, water, electricity charges etc. have been correctly made vide Annexures A to C and that there are no other demands outstanding against the contractor on this contract.
7. Certified that the issues of all stores as per statement attached (whether charged to the contractor or direct to the work) have been technically checked and represent fair and reasonable issues for the items of work executed vide Annexure E.
8. Certified that all statutory requirements including PF, ESI, Minimum wages, Insurance, GST, BOCW, etc. are complied with by the Contractor. This should be duly backed by the relevant documents.

Certified for payment of * Rs.....(Rupees.....only).

*Here specify the net amount payable

Signature of Senior Engineer

Date

IV ENTRIES TO BE MADE IN THE FINANCE DEPARTMENT

Passed for.....Rs.....
Less Deductions.....Rs.....
Net Amount Payable.....Rs.....
(Rupees.....only)

Account code head	Debit	Credit
	(Gross Amount)	(Deductions)
TOTAL		

Assistant

Date:

Accountant

Date:

Finance Executive

Date:

ANNEXURE A
Part I

Statement showing details of materials issued to the contractor Shri / M/S.....in respect of Contract Agreement / Work Order No.....Dated..... and covered by the agreement.

Sl.No.	Stores Issue Voucher No. and date	Issue voucher No. and date allotted by stores to the SIV	Description of material issued issued to the contractor	Quantity issued	Quantity actually incorporated in the work	Whether recoverable from the contractor or supplied free	If recoverable from the Contractor				
							Rate at which recoverable	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks

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

Total

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE A
Part II

Statement showing details of materials issued to the contractor Shri / M/S..... in respect of Contract Agreement / Work Order No.....Dated..... and not covered by the agreement

Sl.No	Stores Issue Voucher No. and Date	Issue Voucher No. and date allotted by stores to the SIV	Description of material issued to the contractor	Quantity issued	Quantity actually incorporated in the work	Issue Rate	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks

1	2	3	4	5	6	7	8	9	10	11

TOTAL
Add Departmental Charges
Add GST (Wherever applicable)

GRAND TOTAL

Signature of Contractor
Date:

Signature of Engineer-in-Charge
Date:

Signature of Senior Engineer
Date:

Note: Cost of materials recovered in this bill should be shown against item 4 (a) of the memorandum of payments. The amounts of taxes and departmental charges recovered in this bill should be incorporated in Annexure C.

ANNEXURE B

Statement showing tools and plant issued to the contractor Shri /M/S.....in respect of contract Agreement / Work Order No.....Dated.....

Sl.No.	Description of Tools and Plant Issued	Period for which issued	Rate at which recovery is to be made	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
1	2	3	4	5	6	7	8

TOTAL

Signature of Contractor

Date

Signature of Engineer-in-Charge

Date

Signature of Senior Engineer

Date

ANNEXURE C

Statement showing details of other recoveries to be made from the contractor Shri/M/s..... In respect of Contract Agreement / Work Order No.....Dated.....

Sl.No.	Particulars	Unit	Quantity	Rate	Amount recoverable	Amount recovered upto previous bill	Amount now recovered	Remarks
1	2	3	4	5	6	7	8	9
1	Water charges							
2	Electricity charges							
3	Medical charges							
4	Cost of empty gunny bags and empty containers not returned							
5								
6								
7								

TOTAL

Signature of Contractor

Date

Signature of Engineer in Charge

Date

Signature of Senior Engineer

Date

**ANNEXURE D
DEVIATION STATEMENT**

Name of the Contractor:

Contract Agreement/Work Order No.

Name of the Work:

Date:

SL. No.	Description of Item	Unit	Quantity as per agreement	Quantity as executed	Rate as per agreement	Rate as executed	Amount as per agreement	Amount as executed	Difference		Reason for the deviation with authority, if any
									Excess	Savings	
1	2	3	4	5	6	7	8	9	10	11	12

Signature of Engineer in Charge

Signature of Senior Engineer

Date:

Date:

ANNEXURE E

Statement showing the consumption of materials issued to the contractor Shri/M/s..... in respect of Contract Agreement / Work Order No.....Dated.....

Name of the Work:

ON RECOVERY BASIS

SL. No.	Description of material	Unit	Quantity actually issued	Quantity actually incorporated in the work	Balance	Particulars of disposal of balance	Quantity to be issued as per approved data for work actually done	Variation in consumption (difference between colum 5 & 8)		Rate chargeable for excess/short consumption, if any	Amount Recoverable for excess/short consumption, including materials not returned, if any	Remarks
								More	Less			
1	Cement											
2	Bricks											
3	Wood											
4	Asbestos Sheet											
5	Iron Material											
6												
7												

Signature of Contractor

Signature of Engineer in Charge

Signature of Senior Engineer

Date:

Date:

Date:

Note

1. The quantities shown in columns 4 and 5 above should tally with those shown in columns 5 & 6 respectively of Annexure A (Part I and II)

2. Data statement of theoretical consumption should be attached in support of quantity specified in column 8.

ANNEXURE F

Statement showing details of materials issued to the contractor Shri/M/s..... in respect of Contract Agreement / Work Order No.....dated.....

Name of the Work:

FREE OF COST											
Sl.No	Stores Issue Voucher No.	Description of material	Unit	Quantity issued	Quantity required as per data	Quantity consumed in the work	Balance (if any)	Nature of disposal for the balance	Rate chargeable for material not returned	Amount recoverable for material not returned	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE G
QUESTIONNAIRE TO BE ANSWERED BY THE ENGINEER IN CHARGE AND SENIOR ENGINEER
(Correct particulars and answers to be recorded)

1. Name of the Work:
2. Name of the Contractor:
3. Date of commencement of the Work:
4. Contract agreement /Work Order No. and date:
5. Reference to the supplementary Agreement No. if any:
6. Whether administrative approval and technical sanction has been accorded by the competent authority? If so, cite reference?
7. Whether sanction of the competent authority and financial concurrence of the Finance Department for award of the work has been accorded? If so, cite reference.
8. Whether the work has been completed in time? If not whether penalty has been levied or sanction of the competent authority for extension of time granted and communicated to the Finance Department with reasons for grant of extension? (Due and actual date of completion of the work and reference to letter No. and date granting the extension of time should be given).
9. (a) Whether the rates allowed in the bill have been checked with the contract agreement?
 (b) Whether the rates for extra/supplemental items have been approved by the competent authority and the sanction communicated to the Finance Department together with rate analysis? If so, cite reference
10. Whether deviations have been approved by the competent authority? If yes, give reference to the approval; if not, give reasons.
11. Whether the rates of recovery of stores issued to the contractor which are not provided for in the contract agreement have been settled in consultation with Finance?
12. Whether discrepancies pointed out by the Finance department in the stores statement have been reconciled and accepted by the Finance Department?
13. Whether materials issued to the contractor in excess of the theoretical requirements have been returned to the Stores department and the No. and date of such returned stores vouchers have been shown in Stores statement? If not, whether the cost of such excess materials has been recovered at the prescribed rate? Whether consumption statements in respect of materials chargeable to the work have been attached to the bill?
14. Whether consumption of materials shown has been technically checked by Senior Engineer?
15. Whether materials issued and used in the work is not less than that required for consumption in work according to our specifications? If consumption is less, whether necessary recovery has been made in the bill?
16. Whether measurements have been checked by the Engineer and Senior Engineer to the extent required and certificates of check recorded in the measurement books?
17. Whether contractor has signed the bill and the measurement books without reservations? If not, whether reasons have been intimated to the Finance Department?
18. Whether arithmetical calculations have been checked and certificate recorded in the measurement books by a person other than the one who calculated initially?
19. Whether any work was done at the risk and cost of the contractor and whether such cost has been recovered from him? Give particulars.
20. Whether all advance payments on running accounts have been recovered?
21. Whether all the recoveries due for services given to the contractor like rent of accommodation, water charges, electricity charges have been recovered and whether payments made by the company on behalf of the contractor have been adjusted?
22. Whether the files containing abstracts from measurement books/standard measurement books have been completed/updated?
23. Whether hire charges for tools & plant have been recovered and the statement of hire charges with full details attached?
24. Whether the certificate of workmanship and completion of work according to specifications, drawings etc. is recorded by Engineer Incharge/Senior Engineer and whether recoveries have been made for defective works, if any?
25. Whether all corrections in the bill/measurement books etc. have been neatly made and attested and there are no overwriting?
26. Whether final measurements have been taken as soon as possible after completion of the work and the certificate of completion issued? If not, whether reasons for delay have been recorded and communicated to finance department?
27. In respect of quantities reduced in the final bill as compared to the running payment, whether adequate reasons have been recorded and communicated to finance department?
28. Whether the expenditure has been classified correctly according to heads of account recorded in the sanctioned estimate?
29. Whether the work has been completed within the estimated cost? If not, what is the percentage of excess over the sanctioned estimate/ administrative approval? In case the excess is beyond the competency of the Senior Engineer, what action has been taken for obtaining the approval of the authority competent to sanction the excess?
30. (a) If the contractor has furnished bank guarantee in lieu of cash security deposit towards proper execution of works and guarantee against defects during the maintenance period, whether the period of currency of the bank guarantee covers the entire maintenance period?
 (b) If not whether security deposit has been proposed to be recovered from the final bill?
31. Whether all the previous audit objections raised on running account bills have been settled? If so, cite references.

Signature of Engineer in Charge
 Date:

Signature of Senior Engineer
 Date:

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

Bank Guarantee No.....

Date.....

To

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR NORTHERN REGION,
HRDI & PSNR COMPLEX, PLOT NO. 25,
SECTOR – 16 A, NOIDA – 201301, U.P.

Dear Sirs,

In accordance with the terms and conditions of Invitation for Bids/ Notice Inviting Tender No.....¹ (Tender Conditions), M/s. having its registered office at ² (hereinafter referred to as the 'Tenderer'), is submitting its bid for the work of.....³ invited by M/s Bharat Heavy Electricals Limited (A Govt. of India Undertaking) a company incorporated under the Companies Act, 1956, having its registered office at BHEL House, Siri Fort, Asiad, New Delhi – 110049 through its Unit at Bharat Heavy Electricals Limited, Power Sector Northern Region, HRDI & PSNR Complex, Plot no. 25, Sector – 16 A, Noida – 201301, U.P.

The Tender Conditions provide that the Tenderer shall pay a sum of Rs as Earnest Money Deposit in the form therein mentioned. The form of payment of Earnest Money Deposit includes Bank Guarantee executed by a Scheduled Bank.

In lieu of the stipulations contained in the aforesaid Tender Conditions that an irrevocable and unconditional Bank Guarantee against Earnest Money Deposit for an amount of ⁴ is required to be submitted by the Tenderer as a condition precedent for participation in the said Tender and the Tenderer having approached us for giving the said Guarantee,

we, the[Name & address of the Bank]..... having our Registered Office at(hereinafter referred to as the Bank) being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of Rs. ⁴(in words Rupees.....) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

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

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor/ Contractor/ Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

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

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Tenderer and notwithstanding any security or other guarantee that the Employer may have in relation to the Tenderer's liabilities.

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

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Tenderer but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the ⁶ we shall be discharged from all liabilities under this Guarantee.

We, ... Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁴.....
- b) This Guarantee shall be valid up to ⁵
- c) Unless the Bank is served a written claim or demand on or before _____⁶ all rights under this guarantee shall be forfeited and the Bank shall be relieved and

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

discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
 (Name of the Bank)

Date.....

Place of Issue.....

- ¹ Details of the Invitation to Bid/ Notice Inviting Tender
- ² Name and Address of the Tenderer
- ³ Details of the Work
- ⁴ BG Amount in words and Figures
- ⁵ Validity Date
- ⁶ Date of Expiry of Claim Period

Note:

1. Bidders are advised that expiry of claim period may be kept 3-6 months after validity date..
2. The BG should be on Non-Judicial Stamp paper/ e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/ e-stamp paper shall be purchased in the name of Vendor/ Contractor/ Supplier/ Bank issuing the guarantee.

3. In Case of Bank Guarantees submitted by Foreign Vendors.

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

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

b.1 In such cases, Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. All charges for issuance of Bank Guarantee/ counter-Guarantee should be borne by the Foreign Vendor.

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

- b.2** In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.
- b.3** The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

**STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE
IEC BY BOTH THE PARTIES**

1. Chronology of the Disputes
2. Brief of the Contract/MoU/Agreement/LOI/LOA
3. Brief history of the Disputes:
4. Issues:
5. Details of Claim(s)/Counter Claim(s):

SI. No.	Description of claim(s)/Counter Claim	Amount (in INR)Or currency applicable in the contract	Relevant contract clause

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/ Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/ Counter Claims. The statement of Claims/ Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY BHEL FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

M/s. (Stakeholder's name)

Subject: **NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE CONTRACT BY BHEL**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Dear Sir/Madam,

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which arise out of the above- referred Contract/MoU/Agreement/LOI/LOA are reproduced hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring disputes to conciliation.

In terms of Clause -----of Procedure i.e., Annexure ----- to the Contract/MoU /Agreement / LOI / LOA, we hereby seek your consent to refer the matter to Conciliation by Independent Experts Committee to be appointed by BHEL. You are invited to provide your consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which you might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA.

Please note that upon receipt of your consent in writing within 30 days of the date of receipt of this letter by you, BHEL shall appoint suitable person(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you
Yours faithfully

Representative of BHEL

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

**FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY A
STAKEHOLDER FOR REFERRING THE DISPUTES TO CONCILIATION
THROUGH IEC**

To,

BHEL (Head of the Unit/Division/Region/Business Group)

Subject: **NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE
CONTRACT BY A STAKEHOLDER**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Dear Sir/Madam,

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which have arisen out of the above-referred Contract/MoU/Agreement/LOI/LOA are enumerated hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring inter-se disputes of the Parties to conciliation.

We wish to refer the above-said disputes to Conciliation as per the said Clause of the captioned Contract/MoU/Agreement/LOI/ LOA. In terms of Clause -----of Procedure i.e., Annexure ----- to the Contract/MoU /Agreement / LOI / LOA, we hereby invite BHEL to provide its consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which it might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA and to appoint suitable person(s) as Conciliator(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you
Yours faithfully

Representative of the Stakeholder

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

FORMAT FOR INTIMATION TO THE STAKEHOLDER ABOUT APPOINTMENT OF CONCILIATOR/IEC

To,

M/s. (Stakeholder's name)

Subject: **INTIMATION BY BHEL TO THE STAKEHOLDER AND CONCILIATOR(S) ABOUT APPOINTMENT OF CONCILIATOR/IEC**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

This is with reference to letter dated ----- regarding reference of the disputes arising in connection with the subject Contract No /MoU/Agreement/LOI/LOA to conciliation and appointment of Conciliator(s).

In pursuance of the said letter, the said disputes are assigned to conciliation and the following persons are nominated as Conciliator(s) for conciliating and assisting the Parties to amicably resolve the disputes in terms of the Arbitration & Conciliation Act, 1996 and the Procedure ---- to the subject Contract/MoU/Agreement/LOI/LOA, if possible.

Name and contact details of Conciliator(s)

a)

b)

c)

You are requested to submit the Statement of Claims or Counter-Claims (strike off whichever is inapplicable) before the Conciliator(s) in Format 29 (enclosed herewith) as per the time limit as prescribed by the Conciliator(s).

Yours faithfully,

Representative of BHEL

CC: To Conciliator(s)... for Kind Information please.

Encl: As above

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:
2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings. If BHEL is to initiate Conciliation, then, the invitation to Conciliate shall be extended to the concerned Stakeholder in **Format-30** hereto. Where the stakeholder is to initiate the Conciliation, the notice for initiation of Conciliation shall be sent in **Format-31** hereto.
3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.
4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL. The appointment of Conciliator(s) shall be completed and communicated by the concerned Department/Group of BHEL Unit/Division/Region/Business Group to the other party and the Conciliator(s) within 30 days from the date of acceptance of the invitation to conciliate by the concerned party in the **Format-32**. The details of the Claim, and counter-claim, if any, shall be intimated to the Conciliator(s) simultaneously in **Format-29**.
5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.
6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

- 7.** The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within 15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.
- 8.** Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
- 9.** In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
- 10.** Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
- 11.** When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
- 12.** In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
- 13.** Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.
- 14.** In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after

seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.

- 15.** The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
- 16.** Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
- 17.** In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
- 18.** A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
- 19.** The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.
- 20.** Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.
- 21.** Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged

absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

22. The proceedings of Conciliation under this Scheme may be terminated as follows:

- a.** On the date of signing of the Settlement agreement by the Parties; or,
- b.** By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
- c.** By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
- d.** By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
- e.** On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.

23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	Particulars	Amount
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator) In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator)

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on the, Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL. Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region /

Sl No	Particulars	Amount
		Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

- 24.** The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.
- 25.** If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
- 26.** The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
- 27.** Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.
- 28.** The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 4 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
- 29.** The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement,

except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.

- 30.** The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
- a.** Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - b.** admissions made by the other party in the course of the Conciliator proceedings;
 - c.** proposals made by the Conciliator;
 - d.** The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
- 31.** The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
- 32.** None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
- 33.** The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.
- 34.** The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.