SITE HSE PLAN FOR HPCL- VISAKHAPATNAM SITE SUB- CONTRACTORS

HSE

BHARAT HEAVY ELECTRICALS LIMITED

POWER SECTOR – EASTERN REGION

SITE HSE PLAN FOR HPCL-VISAKHAPATNAM SITE SUB-CONTRACTORS

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This document is prepared based on STANDARD PLAN FOR HSE MANAGEMENT AT CONSTRUCTION SITES Document No 6-82-0001 Rev 07 issued by EIL. This is subject to revision in future. This shall supersede chapters on HSE in SCC.

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 sub-contractors at **HPCL-Visakhapatnam** site. This shall be read along with HSE plan of EIL, OISD standard-192 & 207. In case of any conflict of clauses, the more stringent one shall apply.

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 Sub-contractors at HPCL-Visakhapatnam site

3.0 OBJECTIVES

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces.

- Ensure the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment of the work site.
- Comply at all times with the relevant statutory and contractual HSE requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including sub-contractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps/Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent authority.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.
- Ensure continual improvements in HSE performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.

3.1 Goals and Targets -

- To achieve "Zero loss time Incident at Site"
- 100% compliance of all legal/statutory requirements related to EHS.
- 100% Health, Safety and Environmental Induction training attendance for all employees and sub-sub-contractors.
- 100% High Risk activities to be carried out only after approved Method Statement, HIRA/JSA and Permit to Work are implemented.

- 100% PPEs compliance in high & medium risk activities.
- 100% incident reporting, recording and reviewing for corrective & preventive actions.
- A monthly review shall be scheduled and conducted to assess HSE program compliance and to close any recognized gaps to improve safety management and incident prevention.

4.0 BHEL POWER SECTORHEALTH, SAFETY & ENVIRONMENT POLICY

Power Sector HSE Policy

We, at BHEL Power Sector, reaffirm our belief that the Health and Safety of our stakeholders and conservation of Environment is of utmost importance and takes precedence in all our business decisions. In pursuit of this belief and commitment, we strive to:

- ✓ **Ensure total compliance with applicable legislation, regulations and other requirements concerning Occupational Health, Safety and Environment.**
- ✓ **Ensure continual improvement in the Occupational Health, Safety and Environment Management System performance.**
- ✓ **Enhance Occupational Health, Safety and Environment awareness amongst employees, customers and suppliers by proactive communication and training.**
- ✓ **Review periodically and improve Occupational Health, Safety and Environment Management System to ensure its continuing suitability, adequacy and effectiveness in a continuously changing business environment.**
- ✓ **Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees to fulfill their Health, Safety and Environmental obligations.**
- ✓ **Incorporate appropriate Occupational Health, Safety and Environmental criteria into business decisions for selection of plant, technology and services as well as appointment of key personnel.**
- ✓ **Ensure availability at all times of appropriate resources to fully implement the Occupational Health, Safety and Environmental policy of the company.**

This policy will be communicated to all employees and made available to interested parties.

Sd/-

Director (Power)

5.0 TERMS AND DEFINITIONS

5.1 DEFINITIONS

5.1.1 INCIDENT

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

5.1.2 NEAR MISS

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as "Near-Miss".

5.1.3 MAN-HOUR WORKED

The total number of employee hours worked by all employees including sub-contractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labours. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workday for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

5.1.4 FIRST AID CASES

First 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.

5.1.5 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.

5.1.6 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.

5.1.7 TYPE OF INCIDENTS & THEIR REPORTING:

The three categories of Incident are as follows:

Non-Reportable Cases:
An incident, where the injured person is given medical help and discharged for work without counting any lost time.

Reportable Cases:
In this case the injured person is disable for 48 hours or more and is not able to perform his duty.

Injury Cases:

These are covered under the heading of non-reportable cases. In these cases the incident caused injury to the person, but he still continues his duty.

5.1.8 **TOTAL REPORTABLE FREQUENCY RATE**

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

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

5.1.9 **SEVERITY RATE**

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

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

5.1.10 **INCIDENCE RATE**

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

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

6.0 HSE ORGANISATION

The deployment matrix of HSE personnel is furnished below:

No of workers deployed	Requirement of safety personnel for every shift		
	Safety Steward	Safety supervisor	Safety Officer
1-50	1	1	1
51-100			
101-150	2		
151-200			
201-250	3		
251-300		2	
301-350	4		
351-400			
401-450	5		
451-500			
501-1000	10	4	2
1001-1500	15	6	3
1501-2000	20	8	4

In case, no of workers goes beyond 2000, then proportional additional deployment to be made. In case, the vendor fails to deploy these personnel on time, BHEL shall levy a penalty of Rs50000/- for delay of every month of deployment for every safety officer, Rs 30000/- for every safety supervisor and Rs20000/ for every safety steward. Pl note that the above matrix shows minimum strength of safety manpower. **Additional manpower may be demanded by BHEL if need arises and the sub-contractor shall comply**.

6.1 QUALIFICATION FOR HSE PERSONNEL

a) Safety Steward/Observer

As a minimum, he shall possess class XII pass certificate and trained in fire-fighting as well as in safety/occupational health related subjects, with minimum two year of practical experience in construction work environment and should have adequate knowledge of the local language spoken by majority of the workers at the construction site.

b) Safety Supervisor

As a minimum, he shall possess a recognized graduation Degree in Science (with Physics & Chemistry) or a diploma in Engg. or Tech. with minimum Two years of practical experience in construction work environment and should possess requisite skills to deal with construction safety & fire related day-to-day issues.

c) Safety Officer / Safety Engineer

Safety officer/Engineer Should Possess following Qualification &Experience:

(i) Recognized degree in any branch of Engg. or Tech. or Architecture with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than two years,

or

possessing recognized diploma in any branch of Engg. or Tech with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than five years.

(ii) Recognized degree or diploma in Industrial safety

(iii) Preferably have adequate knowledge of the language spoken by majority of the workers at the construction site.

Alternately

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

d) HSE In-Charge

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

In case the statutory requirements i.e. State or Central Acts and / or Rules as applicable like the Building and Other Construction Workers' Regulation of Employment and Conditions of Service- Act,1996 or State Rules (wherever notified), the Factories Act, 1948 or Rules (wherever notified), etc. are more stringent than above clarifications, the same shall be followed.

Sub-Sub-contractors shall ensure physical availability of safety personnel at the place of specific work location, where Hot Work Permit is required/granted. No work shall be started at any of the project sites until above safety personnel & concerned

Site Engineer of Sub-contractor are physically deployed at site. The Sub-contractor shall submit a HSE Organogram clearly indicating the lines of responsibility and reporting system The sub-Sub-contractor shall verify & authenticate credentials of such safety personnel and furnish Bio-Data/Resume/Curriculum Vitae of the safety personnel as above for BHEL's scrutiny followed by EIL/Owner's approval, at least 1 month before the mobilization. The Sub-contractor, whenever required, shall arrange submission of original testimonials/certificates of their Safety personnel, to BHEL and subsequently EIL/Owner (for Verification/scrutiny, etc.)

Imposition / Realization of penalty shall not absolve the Sub-contractor from his/ her responsibility of deploying competent safety officer at site. Adequate planning and deployment of safety personnel shall be ensured by the Sub-contractor so that field activities do not get affected because of non-deployment of competent & qualified safety people in appropriate numbers.

6.2 RESPONSIBILITIES

6.2.1 SITE IN -CHARGE OF SUB-CONTRACTOR

- 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 authorities.
- Shall ensure that provisions stipulated in contract Labour Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs) available with the site management.
- Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
- Shall ensure that Horseplay is strictly forbidden.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under sub-contractor are working safely and do not create any Hazard to self and to others.

- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of HSE audit, mock drill, medical camps, induction training and training on HSE at site.
- Shall ensure full co-operation during HQ/External /Customer HSE audits.
- Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the work site.
- Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labour colony.
- Shall ensure adequate emergency preparedness.
- Shall be member of site HSE committee and attend all meetings of the committee

6.2.2 **HEALTH, SAFETY AND ENVIRONMENT OFFICER OF SUB-CONTRACTOR**

- 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, sub-contractors on HSE matters
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7.0 Implementation, Inspection/ Monitoring

 The Sub-contractor shall be fully responsible for planning, reporting, implementing and monitoring all HSE requirements and compliance of all laws & statutory requirements.

 The Sub-contractor shall also ensure that the HSE requirements are clearly understood & implemented conscientiously by their site personnel at all levels at site.

 The Sub-contractor shall ensure physical presence of their field engineers / supervisors, during the continuation of their contract works / site activities including all material transportation activities. Physical absence of experienced field engineers / supervisors of Sub-contractor at critical work spot during the course of work, may invite severe penalization as per the discretion of EIC, including halting / stoppage of work.

 Sub-contractor shall furnish their annual Inspection Plan, with regard to project issues /subjects, frequency and performers to EIL/Owner.

 The Sub-contractor shall regularly review inspection report internally and implement all practical steps / actions for improving the status continuously.

 The Sub-contractor shall ensure important safety checks right from beginning of works at every work site locations and to this effect format No: HSE-10 “Daily Safety Check List” shall be prepared by field engineer & duly checked by safety personnel for conformance.

 The Sub-contractor shall carry out inspection to identify various unsafe conditions of work sites/machinery/equipment’s as well as unsafe acts on the part of workmen/supervisor/engineer while carrying out different project related works.

 Adequate records for all inspections shall be maintained by the Sub-contractor and the same shall be furnished to BHEL or EIL/Owner, whenever sought.

 The Sub-contractor shall not carry-out work by engaging single worker anywhere without any supervisor anytime during day or night.

 To demonstrate involvement/commitment of site management of Sub-contractor, at least one Safety Walk through in a month shall be carried out by Sub-contractor’s head of site (along with his area manager/field engineers) and a report shall be furnished to BHEL as per format No: HSE-1” Safety walk through report” followed by compliance for unsatisfactory remarks.

 As a general practice lifting tools/ tackles, machinery, accessories etc. shall be inspected, tested and examined by competent people (approved by concerned State authorities) before being used at site and also at periodical interval (e.g. during replacement, extension, modification, elongation/ reduction of machine/parts, etc.) as per relevant statutes. Cranes, lifting machinery, mobile equipment’s / machinery / vehicles, etc. shall be inspected regularly by only competent / experienced personnel at site and requisite records for such inspections shall be maintained by every sub-contractor. Sub-contractor shall also maintain records of maintenance of all other site machinery (e.g. generators, rectifiers, compressors, cutters, etc.) & portable tools/equipment’s being used at project related works (e.g. drills, abrasive wheels, punches, chisels, spanners, etc.).The Sub-contractor shall not make use of arbitrarily fabricated ‘derricks’ at project site for lifting / lowering of construction materials.

 Site facilities /temporary. installations, e.g. batching plant, cement godown, DG-room, temporary electrical panels/distribution boards, shot-blasting booth, fabrication yards, etc. and site welfare facilities, like labour colonies, canteen/pantry, rest-shelters, motor cycle/bicycle-shed, site washing facilities, First-aid centers, urinals/toilets, etc. should be periodically inspected by Sub-contractor (preferably utilizing HR/Admn. personnel to inspect site welfare facilities) and records to be maintained.

8.0 Behaviour Based Safety

BHEL shall develop a system to implement Behaviour-Based Safety (BBS) through which work groups can identify, measure and change the behaviours of employees and workers towards construction safety aspects. The sub-contractor shall whole- heartedly participate in the exercises for effective implementation of BBS

 The BBS process shall include the following:

- Identify the behaviours critical to obtaining required safety performance.
- Communicate the behaviours and how they are performed correctly to all
- Observe the work force and record safe/at risk behaviours. Intervene with workers to give positive reinforcement when safe behaviours are observed. Provide coaching/correction when at risk behaviours are observed
- Collect and record observation data
- Summarize and analyze observation data
- Communicate observation data and analysis results to all employees
- Provide recognition or celebrate when safe behaviour improvements occur
- Change behaviours to be observed or change activators or change consequences as appropriate.
- Communicate any changes to workforce

 BHEL through its own HSE committee shall implement the above process.

 The necessary procedures and Monthly reporting formats shall be developed by the BHEL for approval by EIL/ Owner.

 The HSE committee of BHEL shall observe individual's behavior for safe practices adapted for utilization/ execution of work for following as a minimum: -

- PPE
- Tools & equipment
- Hazard Identification & control
- House keeping
- Confined space entry
- Hot works
- Excavation
- Loading & unloading
- Work At height
- Stacking & storage
- Ergonomics
- Procedures

9.0 **Awareness and Motivation**

- The sub-Contractor shall promote and develop awareness on Health, Safety and Environmental protection among all personnel working for the sub-Contractor.Regular awareness programs and fabrication shop/work site meetings atleast on monthly basis shall be arranged on HSE activities to cover hazards/risks involved in various operations during construction.

- Sub-Contractor to motivate & encourage the workmen & supervisory staff by issuing/ awarding them with tokens/ gifts/ mementos/ monetary incentives/ certificates etc. It may be centrally done along with other Sub-contractors at site
- Sub-Contractor shall assess & recognize the behavioral change of its site engineers / supervisors periodically and constantly motivate / encourage them to implement HSE practices at project works.

10. Fire prevention, protection & preparedness -

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

The purpose of which is to prevent -

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

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

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

- Area where Hot work activities are carried out (Gas cutting / Welding/ any other spark producing work) above a working spot, a GI / fire-resistant non-asbestos sheet or suitable material shall be placed to prevent the fall of hot sparks. A bucket of water shall be kept nearby while doing hot work

- Hot work shall be preferably carried out in a designated area with a standing Hot Work Permit, to be renewed monthly. The designated area shall have fire extinguishers.
- Any hot work outside designated area shall require a Hot Work permit and fire watch.

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

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

Fire Extinguisher Chart

Extinguisher		Type of Fire				
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No
	Carbon Dioxide (CO_2)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

In addition, ABC type extinguisher also can be used for any of above types of fire

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

General flammable material storage requirements:

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

11.0 MEDICAL FACILITIES

11.1 MEDICAL CENTRE (As per Schedule V, X and XI of BOCW central Rules, 1998) ((as stipulated in the contract)

- A medical center shall be setup at site with basic facilities for handling medical emergencies. The medical center shall be developed independently by an agency or jointly on proportionate sharing basis as stipulated in the contract.
- A qualified medical professional, not less than MBBS, shall be deployed at the medical center
- Ambulance as stipulated in the contract shall be deployed along with a trained driver and accessories.
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste –Management and Handling Rules, 1998)

11.2 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.

11.3 **FIRST AID BOX**

- The sub-contractor shall provide necessary first aid facilities. At every work place first aid facilities shall be provided and maintained.

- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact no to be displayed on the box.
- The first aid boxes should be placed at various elevations so as to make them available within the reach and at the quickest possible time.
- The first aid box shall be distinctly marked with a Green Cross on white background.

- Details of contents of first aid box is given in Annexure No.
- Monthly inspection of First Aid Box shall be carried out by the owner as per format no. HSEP:14-F01
- The sub-contractor should conduct periodical first –aid classes to keep his supervisor and Engineers properly trained for attending to any emergency.

12.0 HSE AUDIT

- There shall be HSE audit by BHEL and/or External auditors at least on half-yearly basis. The sub-contractor shall assist BHEL in all possible ways to face the audit and take necessary corrective actions to the satisfaction of the auditors.
- The sub-contractor shall also conduct internal audit at an interval not more than 3 months. The internal audit report shall be furnished to BHEL.

13.0 Meetings

- The Sub-Contractor shall ensure participation of his top most executive at site (viz. Resident Construction Manager / Resident Engineer/ Project Manager / Site-in-Charge) in Safety Committee/HSE Committee meetings arranged by BHEL on weekly basis and EIL/ Owner usually on monthly basis or as and when called for. In case contractor's top most executive at site is not in a position to attend such meeting, he shall inform BHEL in writing before the commencement of such meeting indicating reasons of his absence and nominate his representative – failure to do so may invite very stringent penalization against the specific sub-Contractor, as deemed fit in Contract. The RCM shall attend the weekly HSE meeting convened BHEL along with safety officers and package-in-charges under him. The obligation of compliance of any observations during the meeting shall be always time bound. The Sub-Contractor shall always assist BHEL to achieve the targets set by them on HSE management during the project implementation.
- Agenda of internal HSE meeting should broadly cover: -

a) Confirmation of record notes /minutes of previous meeting

b) Discussion on outstanding subjects of previous points / subjects, if any

c) Incidents / Accidents (of all types) at project site, if any

d) Current topics related to site activities / subjects of discussion

e) House keeping

f) Behavioral Safety

g) Information / views / deliberations of members / site, sub-contractors

h) Report from Owner / Client

i) Status of Safety awareness, Induction programs & Training programs

The time frame for such HSE meeting shall be religiously maintained by one and all

14.0 **GENERAL DISCIPLINE:**

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

14.1 Penalty

The sub-contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliances and also for repeated failure in implementation of any of the HSE provisions, BHEL may impose stoppage of work without any cost & time implication to BHEL and/or impose a suitable penalty.

BHEL shall pass on the penalty to the sub-contractor if any levied by the Owner/EIL if the reason of levy of such penalty is attributable to the sub-contractor.

This penalty shall be in addition to all other penalties specified elsewhere in the contract. The decision of imposing stop-work-instruction and imposition of penalty shall rest with EIL/Owner. The same shall be binding on the Contractor. Imposition of penalty does not make the sub-Contractor eligible to continue the work in unsafe manner.

The amount of penalty applicable for the Contractor on different types of HSE violations is specified below:

Sl. No.	Violation of HSE norms	Penalty Amount
1.	For not using personal protective equipment (Helmet, Shoes, Goggles, Gloves, Face shield, Boiler suit, etc.)	Rs.500/- per day/ Item / Person.
2.	Working without Work Permit/Clearance	Rs.20,000/- per occasion
3.	Execution of work without deployment of requisite field engineer / supervisor at work spot	Rs.5,000/- per violation per day

4.	Unsafe electrical practices (not installing ELCB, using poor joints of cables, using naked wire without top plug into socket, laying wire/cables on the roads, electrical jobs by incompetent person, etc.)	Rs.10,000/- per item per day.
5.	Working at height without full body harness, using non-standard/ rejected scaffolding and not arranging fall protection arrangement as required, like handrails, life-lines, Safety Nets etc.	Rs.10,000/- per case per day
6.	Unsafe handling of compressed gas cylinders (No trolley, jubilee clips double gauge regulator, and not keeping cylinders vertical during storage/ handling, not using safety cap of cylinder).	Rs.500/- per item per day.
7.	Use of domestic LPG for cutting purpose / not using flash back arresters on both the hoses/tubes on both ends.	Rs.3,000/- per occasion
8.	No fencing/barricading of excavated areas / trenches.	Rs.3,000/- per occasion
9.	Not providing shoring/strutting/proper slope and not keeping the excavated earth at least 1.5M away from excavated area.	Rs.5,000/- per occasion
10.	Non display of scaffold tags, caution boards, list of hospitals, emergency services available at work locations.	Rs.1,000/- per occasion per day
11.	Traffic rules violations like over speeding of vehicles, rash driving, talking on mobile phones during vehicle driving, wrong parking, not using seat belts, vehicles not fitted with reverse horn / warning alarms / flicker lamps during foggy weather.	Rs.2,000/- per occasion per day
12	Absence of sub-contractor's RCM/ SIC or his nominated representative (prior approval must be taken for each meeting for nomination) from site HSE meetings whenever called by BHEL or EIL/Owner& failure to nominate his immediate deputy (in the site-organogram) for such HSE meetings.	Rs.10,000/- per meeting

13.	Failure to maintain HSE records by sub-contractor Safety personnel, in line with approved HSE Plan/Procedures/Contract specifications	Rs.10,000/- per month
14.	Failure to conduct daily site safety inspection (by sub-contractor's safety engineers/safety officers), internal HSE Awareness/ Motivation Program, Not participating in Site HSE Training and HSE audit at predefined frequencies	Rs.10,000/- per occasion
15.	Failure to submit the monthly HSE report by 2nd of subsequent month to BHEL site HSE head	Rs.10,000/- per occasion and Rs. 1,000/- per day of further delay.
16.	Poor House Keeping	Rs.5,000/- per occasion per subject
17.	Failure to report &follow up accident (including Near Miss) reporting system within specific timeframe.	Rs.20,000/- per occasion
18.	Degradation of environment (not confining toxic spills, spilling oil/ lubricants onto ground)	Rs.10,000/- per occasion
19.	Not medically examining the workers before allowing them to work at height / to work in confined space / to work in shot-blasting / to work for painting / to work in bitumen or asphalt works, not providing ear muffs while allowing them to work in noise polluted areas, made them to work in air polluted areas without respiratory protective devices, etc.	Rs.5,000/- per occasion per worker
20.	Violation of any other safety condition as per job HSE plan / work permit and HSE conditions of contract (e.g. using crowbar on cable trenches, improper welding booth, not keeping fire extinguisher ready at hot work site, unsafe rigging practices, non-availability of First-Aid box at site, not providing dead man handle switch for blasting, whiplash arrestor for the compressor line, not using hood with respiratory devices by blaster for shot//grit blasting, etc.)	Rs.5,000/- per occasion
21.	Penalty for non-deployment of ambulance (if it is included in package) within a week of beginning of mobilization or otherwise providing dedicated emergency vehicle in any case.	Rs.3,000/- per day

22.	Failure to carry-out Safety audit in time (internal & external), close-out of identified shortfalls of Observations of Safety Aspects(OSA), etc.	Rs.20,000/- per occasion
23.	Carrying out sand blasting instead of grit/shot blasting.	Rs.50,000/- per day
24.	Failure to deploy adequately qualified and competent Safety Officer	Rs.10,000/- per day per Officer
25.	Utilization of hydra/back-hoe loader for material shifting or any other unauthorized /unsafe lifting works	Rs.25,000/- per occasion
26.	Any Fatal Accident	Rs.10,00,000/- per fatality
27.	Any violation not covered above	To be decided by BHEL or EIL/Owner.

The sub-contractor shall make his field engineers/supervisors fully aware of the fact that they keep track with the site workmen for their behavior and compliance of various HSE requirements. Safety lapses / defects of project construction site shall be attributable to the concerned job supervisor / engineer of the sub-contractor, (who remains directly responsible for safely executing field works). For repeated HSE violations, concerned job supervisor / engineer shall be reprimanded or appropriate action, as deemed fit, shall be initiated (with an information to EIL & Owner) by the concerned sub-contractor.

Sub-contractor shall initiate verbal warning shall be given to the worker/employee during his first HSE violation. A written warning shall be issued on second violation and specific training shall be arranged / provided by the sub-contractor to enhance HSE awareness/skill including feedback on the mistakes/ flaws. Any further violation of HSE stipulations by the erring individuals shall call for his forthright debar from the specific construction site. A record of warnings for each worker/employee shall be maintained by the sub-contractor, like by punching their cards / Gate passes or by displaying their names at the Project entry gate. Warnings, penalizations, appreciations etc. shall be discussed in HSE Committee meetings by site Head of the BHEL.

15.0 Accident/ Incident investigation

All accidents/incidents shall be informed to BHEL at least telephonically by Sub-contractor immediately and in writing within 24 hours on Format No. HSE-2 as applicable, by Sub-contractor. Thereafter, a Supplementary Accident/Incident investigation Report on Format No. HSE-3 shall be submitted to BHEL within 72 hours. Near Miss incident(s), Dangerous accidents/incident shall also be reported on Format No. HSE-4 within24 hours. The accident/ incident shall be investigated by a team of Sub-contractor's senior Site personnel (involving Site-in-Charge or at least by his deputy) for establishing root-cause and recommending corrective & preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to BHEL. BHEL/EIL/Owner shall have the liberty to independently investigate such occurrences and the Sub-contractor shall extend all necessary help and cooperation in this regard. BHEL/EIL/Owner shall have the right to share the content of this report with the outside world.

16.0 House Keeping

The Sub-contractor shall ensure that a high degree of housekeeping is maintained and shall ensure inter-alia; the followings:

a) All surplus earth and debris are removed/ disposed-off from the working areas to designated location(s).

b) Unused/ surplus cables, steel items and steel scrap lying scattered at different places within the working areas are removed to identify location(s).

c) All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).

d) Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete, chips and bricks etc. shall not be allowed on the roads to obstruct free movement of men & machineries.

e) Fabricated steel structural, pipes & piping materials shall be stacked properly for erection.

f) Water logging on roads shall not be allowed.

g) No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

h) Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.

i) Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant area/ or these materials shall be transported with top surface wet.

j) The sub-contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.

k) At least two exits for any unit area shall be assured at all times – same arrangement is preferable for digging pits / trench excavation / elevated work platforms/ confined spaces etc.

l) Welding cables and the power cable must be segregated and properly stored and used. The same shall be laid away from the area of movement and shall be free from obstruction.

m) Schedule for upkeep/ cleaning of site to be firmed up and implemented on regular basis.

The Sub-contractor shall carry-out regular checks (minimum one per fortnight) as per format No: HSE-11 for maintaining high standard of housekeeping and maintain records for the same. The Sub-contractor shall provide supervisor for housekeeping exclusively for management of day-to-day housekeeping activities.

17.0 HSE Measures

17.1 Construction Hazards

The Sub-contractor shall ensure identification of all Occupational Health, Safety & Environmental hazards in the type of work he is going to undertake and enlist mitigation measures. Sub-ontractor shall carry out HIRAC specifically for high risk jobs/critical jobs like

a) Working at height (+2.0 Mts height) for cold (incl. colour washing, painting, insulation
etc.) & hot works.

b) Work in confined space,

c) Deep excavations &trench cutting (depth > 2.0 mts.)

d) Operation & Maintenance of Batching Plant.

e) Shuttering / concreting (in single or multiple pour) for columns, parapets & roofs.

f) Erection & maintenance of Tower Crane.

g) Erection of structural steel members / roof-trusses / pipes at height more than 2.0 Mts. With or without crane.

h) Erection of pipes (full length or fabricated) at height more than 2.0 Mts. height with Crane of 100T capacity.

i) All lifts using 100T Crane plus mechanical pulling.

j) All lifts using two cranes in unison (Tandem Lifting).

k) Any lift exceeding 80% capacity of the lifting equipments (crane etc.).

l) Laying of pipes (isolated or fabricated) in deep narrow trenches – manually or mechanically.

m) Maintenance of crane / extension or reduction of crane-boom on roads or in yards.

n) Erection of any item at >2.0 Mts. height using 100T crane or of higher capacity

o) Hydrostatic test of pipes, vessels & columns and water-flushing.

p) Radiography jobs (in-plant & open field)

q) Work in Live Electrical installations / circuits

r) Handling of explosives & Blasting operations

s) Demolishing/ dismantling activities

t) Welding/ gas cutting jobs at height (+2.0 Mts.)

u) Lifting/placing roof-girders at height (+2.0 Mts.)

v) Lifting & laying of metallic / non-metallic sheet over roof/structures.

w) Lifting of pipes, gratings, equipments/ vessels at heights (+2.0 Mts) with & without using cranes

x) Calibration of equipment, instruments and functional tests at yards / work-sites.

y) Operability test of Pump, Motors (after coupling) & Compressors.

z) Cold or Hot works inside Confined Space.

aa) Transportation & shifting of ODC consignments into project areas.

bb) Working in “charged/Live” elect. Panels

cc) Stress Relieving works (Electrically or by Gas-burners).

dd) Pneumatic Tests

ee) Card board blasting

ff) Chemical cleaning

And take feedback from BHEL or EIL/Owner. The necessary HSE measures devised shall be put in to place, prior to start of an activity &also shall be maintained during the course of works, by the sub-contractor. Copies of such HIRAC shall be kept available at work sites by the Contractor to enable all concerned carrying out checks / verification.

A list of typical construction hazards along with their effects & preventive measures is given in **Appendix-E.**

17.2 **Accessibility**

The sub-contractor shall provide safe means of access (in sufficient numbers) & efficient exit to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen and BHEL and EIL/Owner.

- The Sub-contractor shall implement use of all measures including use of "life line", "fall-arresters", "retractable fall arresters, "safety nets" etc. during the course of using all safe accesses& exits, so that in no case any individual remains at risk of slip & fall during their travel.
- The access to operating plant / project complex shall be strictly regulated. Any person or vehicle entering such complex shall undergo identification check, as per the procedures in force / requirement of EIL/Owner.
- Accessibility to 'confined space' shall be governed by specific system / regulation, as established at project site.

17.3 Personal Protective Equipment (PPEs)

- The Sub-contractor workmen shall be permitted entry inside the project premises only with proper PPEs.
- The Sub-contractor shall ensure that all their staff, workers and visitors including their sub-contractor(s) have been issued (records to be kept) & wear appropriate PPEs like nape strap type safety helmets preferably with head &sweat band with ¾" cotton chin strap (made of industrial HDPE), safety shoes with steel toe cap and antiskid sole, full body harness (CЄ marked and conforming to EN361), protective goggles, gloves, ear muffs, respiratory protective devices, etc. All these gadgets shall conform to applicable IS Specifications/ CE or other applicable international standards. The Sub-contractor shall implement a regular regime of inspecting physical conditions of the PPEs being issued / used by the workmen of their own & also its sub-agencies and the damaged / unserviceable PPEs shall be replaced forthwith.
- Owner/EIL may issue a comprehensive color scheme for helmets to be used by various agencies. The Sub-contractor shall follow the scheme issued by the owner/EIL and shall choose any colour other than white (for Owner) or blue (for EIL) All HSE personnel shall preferably wear dark green band on their helmet so that workmen can approach them for guidance during emergencies. HSE personnel shall preferably wear such dresses with fluorescent stripes, which are noticeable during night, when light falls on them.
- Florescent jackets with BHEL logo to be worn by the sub-contractor workmen with different color coding for categories like supervisor and workmen – Green for supervisory and above cadre, Red for workmen (Pl see pic below)
- For shot blasting, the usage of protective face shield and helmets, gauntlet and protective clothing is mandatory. Such protective clothing should conform relevant IS Specification.
- For off-shore jobs/contracts, sub-contractor shall provide PPEs (new) of all types to EIL & Owner's personnel, at his (sub-contractor's) cost. All personnel shall wear life jacket at all time.
- An indicative list of HSE standards/codes is given under **Appendix-A**.
- Sub-contractor shall ensure procurement & usage of following safety equipment's/ accessories (conforming to applicable IS mark / CE standard) by their staff, workmen & visitors all through the span of project construction / pre-commissioning/ Commissioning: according to hazards associated with their jobs. **List is not exhaustive**.

a. PPEs (Helmet with company name/logo, Spectacle, Ear-muff, Face shield, Hand gloves, Safety Shoes, Gum boot)
b. Barricading tape / warning signs
c. Rechargeable Safety torch (flame-proof)
d. Safety nets (with tie-chords)
e. Fall arresters
f. Portable ladders (varying lengths)
g. Life-lines (steel wire-rope, dia not less than 8.0 mm)
h. Full body harness (double lanyard)
i. Lanyard
j. Karabiner
k. Retractable fall arresters (various length)
l. Portable fire extinguishers (DCP type) – 5 kg capacity
m. Portable Multi Gas detector(**To be brought by a package holder where confined space work is involved**)
n. Sound level meter (**Civil and GT vendor to make it available**)
o. Digital Lux meter (**Civil and GT Vendor to make it available**)
p. Fire hoses & flow nozzles
q. Fire blankets / Fire retardant cloth (with eyelets)

Proposed colour codes of helmets and coverall / jackets to be implemented at VRMP

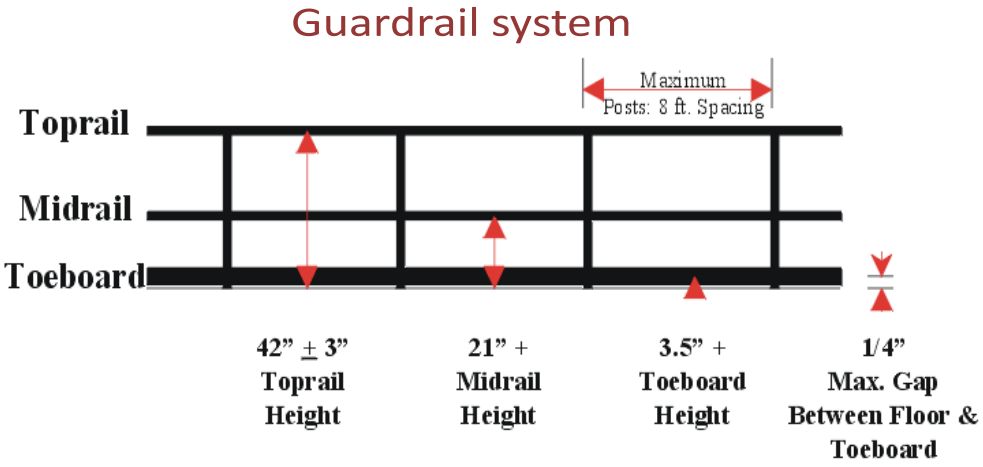
Sl. No	Designation	Helmet	Reflective Jacket
1	Staffs / Visitors / Vendors	White (For visitors/vendors " VISITOR" to be stencilled with RED, both on front & back side)	Green
2	HSE Personnel	Green	Green
3	Workers	Orange	Yellow
4	Riggers	Orange ('RIGGERS' to be stencilled in RED on back side)	Orange
5	Electrician	Red	Red
6	Scaffolding Inspector	Orange (with Green strap on both side)	Orange
7	Housekeeping Personnel	Purple	Orange

Sample to be approved by customer

17.4 Working at height

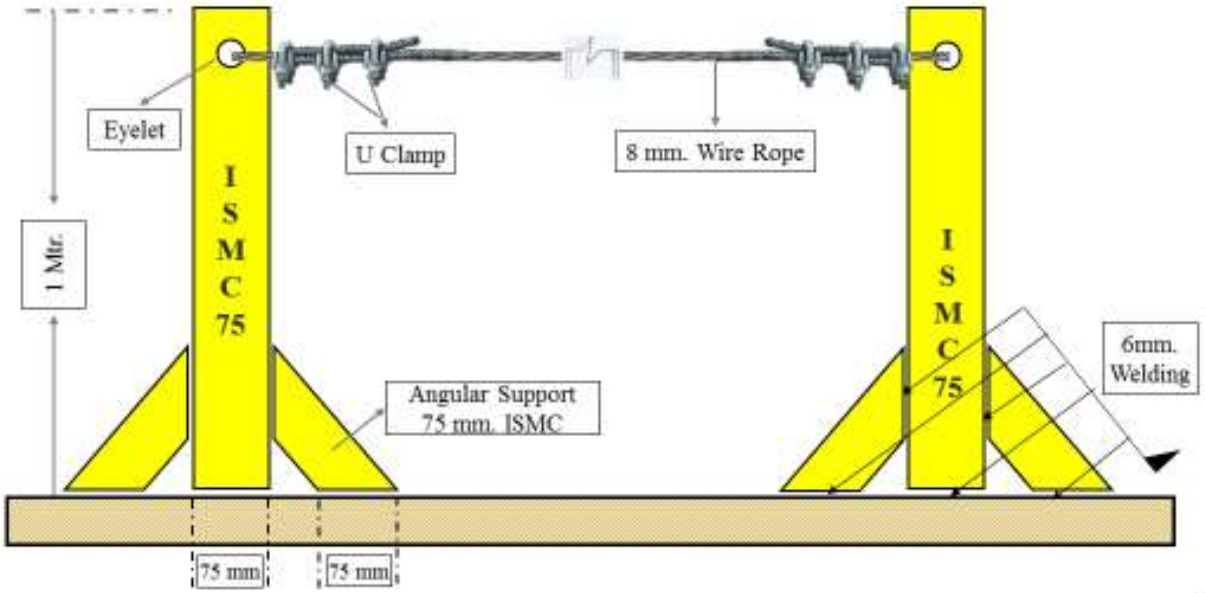
- BHEL shall issue permit for working (PFW) at height after verifying and certifying the checkpoints as specified in the attached permit (Format No. HSE-6). He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence of personal protective equipment's. Sub-contractor's Safety Officer and subsequently BHEL's safety officer shall verify compliance status of the items of permit document after implementation of action is completed by Sub-contractor's &BHEL's execution / field engineers at work site. HIRAC for specific works at height duly commented by EIL/Owner, shall be kept attached with particular Permit for Work (PFW) at site for ready reference & follow-up.
- Such PFW shall be initially issued for one single shift or expected duration of normal work and extended further for balance duration, if required. EIL/Owner can devise block-permit system at any specific area, in consultation with project specific HSE Committee to specify the time-period of validity of such PFW or its renewal. This permit shall be applicable in areas where specific clearance from Owner's Operation Deptt./ Safety Deptt. is not required. EIL / Owner's field Engineers/ Safety Officers/ Area Coordinators may verify and counter sign this permit (as an evidence of verification) during the execution of the job.
- All personnel shall be medically examined & certified by registered doctor, confirming their 'medical fitness for working at height. The fitness examination shall be done once in six months.
- In case work is undertaken without taking sufficient precautions as given in the permit, BHEL or EIL/ Owner Engineers may exercise their authority to cancel such permit and stop the work till satisfactory compliance/rectification is arranged made. BHEL shall maintain a register for issuance of permit and extensions thereof including preserving the used permits for verification during audits etc.
- The sub-contractor shall arrange (at his cost) and ensure use of Fall Arrester Systems by his workers. Fall arresters are to be used while climbing/descending tall structures or vessels / columns etc. These arresters should lock automatically against the anchorage line, restricting free fall of the user. The device is to be provided with a double security opening system to ensure safe attachment or release of the user at any point of rope. In order to avoid shock, the system should be capable of keeping the person in vertical position in case of a fall.
- The sub-contractor shall ensure that Full body harnesses conforming EN361 and having authorized CЄ marking is used by all personnel while working at height. The lanyards and life lines should have enough tensile strength to take the load of the worker in case of a fall. One end of the lanyard shall be firmly tied with the harnesses and the other end with life line. The harness should be capable of keeping the workman vertical in case of a fall, enabling him to rescue himself.
- The sub-contractor shall provide Roof Top Walk Ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages and falls.

- The sub-contractor shall ensure that a proper Safety Net System is used wherever the hazard of fall from height is present. The safety net, preferably a knotted one with mesh ropes conforming to IS 5175/ ISO 1140 shall have a border rope & tie cord of minimum 12mm dia. The Safety Net shall be located not more than 6.0 meters below the working surface extending on either side upto sufficient margin to arrest fall of persons working at different heights.
- In case of accidental fall of person on such Safety Net, the bottom most portion of Safety Net should not touch any structure, object or ground.
- Grade separators shall be provided in Pipe-rack/Tech-structures to arrest falling objects like welding spatters, welding rods, nuts, bolts, tools etc. and to facilitate U/G and A/G works simultaneously.
- Beam Clamps may be used for construction of localized temporary working platforms, sheds for welding booths etc. at height in all types of steel structure due to faster installation and requirement of less scaffolding materials.
- Hanging Platform, manufactured by Standard HSE equipment vendors must be encouraged for painting of Buildings etc.
- All the tools used at height (like spanner, screw driver etc.) shall be provided with securing arrangement like back-pack/waist pouch to prevent accidental slippage from worker hand.
- The sub-contractor shall install temporary lightening arrester in tall structures during construction to save human life and to avoid damage to equipment & machineries.
- The sub-contractor shall ensure positive isolation while working at different levels like in the pipe rack areas. The working platforms with toe boards & hand rails shall be sufficiently strong & shall have sufficient space to hold the workmen and tools & tackles including the equipment's required for executing the job. Such working platforms shall have mid-rails, to enable people work safely in sitting posture.



ALL OPENINGS AT HEIGHT SHALL BE BARRIACDED BY PIPES OR STRUCTURALS. TAPE BARRICADE OR THOSE MADE WITH REBAR SHALL NOT BE ACCEPTED.

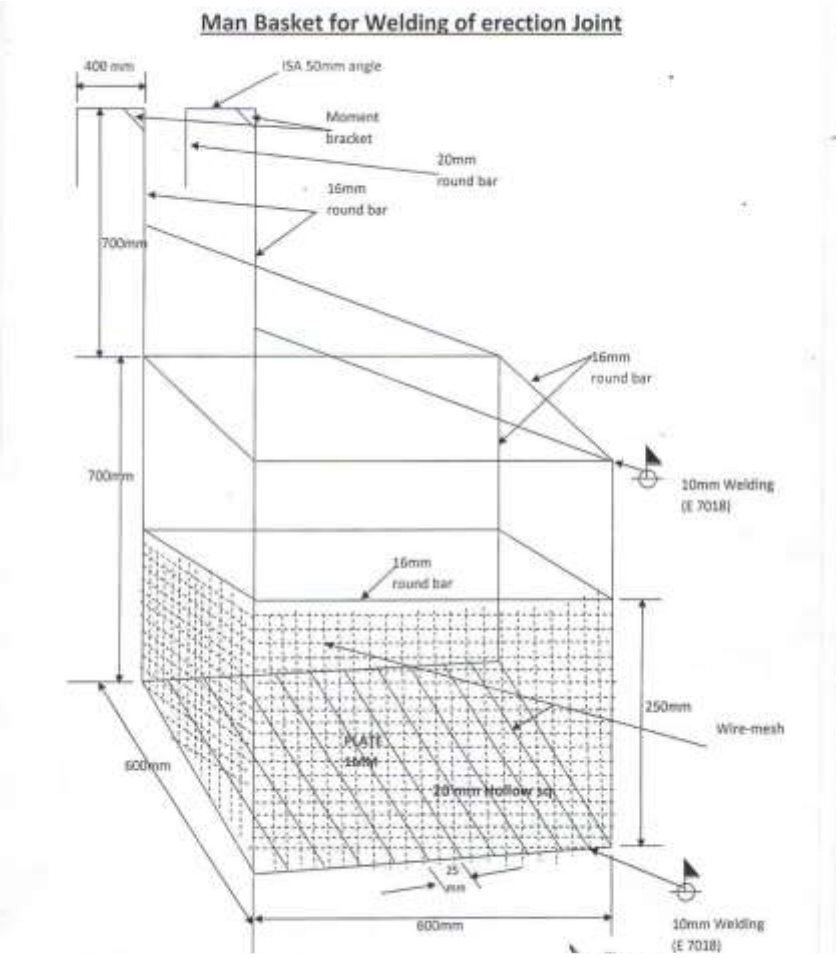
DIAGRAM : LIFELINE POST



- The Support at Vertical Post shall be fixed at End-to-End. The maximum length of one end to another end shall be 18 Mtrs.
- If the length of Lifeline is more than 18 Mtrs. then Intermediate Vertical Post(s) are to be used. Such Intermediate Post(s) will act as supports and the Lifeline Rope should simply pass through the eyelets (holes) of such supports without being anchored.
- The Lifeline need not be wrapped/clamped to any Intermediate Post.
- Such Intermediate Posts must be used at an interval of every 18 Mtrs.
- The Post(s) in which the horizontal Lifeline is to be installed should be capable of sustaining a tensile stress of 5000 Lbs.(2268 Kgs.).
- In a horizontal Lifeline installation maximum allowable sagging is 500-600 NM.
- For a Single Spun Lifeline no more than 2 persons are allowed to work; for more than two workmen another Lifeline should be installed.
- Horizontal Lifeline should be so installed that it does not impede safe movement of workers.
- All the installation work must be carried out by competent persons with adequate knowledge.

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

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



17.5 Scaffoldings& Barricading

- Suitable steel scaffoldings only shall be provided to workmen for all works that cannot be safely done from the ground or from solid construction except such short period work that can be safely done using ladders or certified (by 3rd party competent person) man-basket. When a ladder is used, an extra workman shall always be engaged for holding the ladder.
- The sub-contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Sub-contractor shall always furnish duly approved construction-design details of scaffold & SWL (from competent designers) free of charge, before they are being installed / constructed at site. Owner/EIL and BHEL reserves the right to ask the sub-contractor to submit certification and or design calculations from his Head office/ Design/ Engineering expert regarding load carrying capacity of the scaffoldings. All scaffolds shall be inspected by a competent Scaffolding Inspector of the Contractor. He shall paste a GREEN tag (duly signed by competent Scaffolding Inspector) on each scaffold found safe and a RED tag (duly signed by competent Scaffolding Inspector) on each scaffold found unsafe. Scaffolds with GREEN tag only shall be permitted to be used and Scaffolds with RED ones shall immediately be made inaccessible. Work being found continuing on scaffolds with RED tag shall be considered unauthorized work by sub-contractor and may invite penalization from BHEL/EIL/Owner. For every 120-125 m2 /m3 area / volume or its parts there of minimum one TAG shall be provided.

- The Contractor shall ensure positive barricading (indicative as well as protective) of the excavated, radiography, heavy lift, high pressure hydrostatic & pneumatic testing and other such areas. Sufficient warning signs shall be displayed along the barricading areas.
- Scaffolding shall be constructed using foot seals or base plates only.

17.6 Electrical installations

- All electrical installations/ connections shall be carried out as per the provisions of latest revision of following codes/standards, in addition to the requirements of Statutory Authorities and IE/applicable international rules& regulations:
- OISD STD 173 : Fire prevention & protection system for electrical installations
- SP 30 (BIS) : National Electric Code
- All electrical installations shall be approved by the concerned statutory authorities.
- All temporary electrical installations/ facilities shall be regularly checked by the licensed/ competent electricians of the Sub-contractor and appropriate records shall be maintained in format no: HSE-12" Inspection of temporary electrical booth/ installation at project construction site". Such inspection records are to be made available to EIL/Owner, whenever asked for.

17.6.1 The Sub-contractor shall meet the following requirements:

a. Shall make Single Line Diagram (SLD) for providing connection to each equipment's & machinery and the same (duly approved by EIL/Owner) shall be pasted on the front face of DBs (distribution boards) or JBs (Junction boxes) at every site. (A typical Switch Board Sketch is attached as Appendix -G).

b. Ensure that electrical systems and equipment including tools & tackles used during construction phase are properly selected, installed, used and maintained as per provisions of the latest revision of the Indian Electrical/ applicable international regulations.

c. Shall deploy qualified & licensed electricians for proper & safe installation and for regular inspection of construction power distribution system/points including their earthing. A copy of the license shall be submitted to EIL / Owner for records. Availability of at least one competent (ITI qualified) / licensed electrician (by State Elec. authorities) shall be ensured at site round the clock to attend to the normal/emergency jobs.

d. All switchboards / welding machines shall be kept in well-ventilated & covered shed/ with rain shed protection. The shed shall be elevated from the existing ground level to avoid water logging inside the shed. Installation of electrical switch board must be done taking care of the prevention of shock and safety of machine.

e. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment / switchboard. Adequate clearances and operational space shall be provided around the equipment.

f. Fire extinguishers and insulating mats shall be provided in all power distribution centers.

g. Temporary electrical equipment shall not be employed in hazardous area without obtaining safety permit.

h. Proper housekeeping shall be done around the electrical installations.

i. All temporary installations shall be tested before energizing, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.

j. All welders shall use hand gloves irrespective of holder voltage.

k. Multilingual (Hindi, English and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name & telephone No. of contact person in emergency shall be provided in substations and near all distribution boards / local panels.

l. Operation of earth leakage device shall be checked regularly by temporarily connecting series test lamp (2 bulbs of equal rating connected in series) between phase and earth. ELCB tester /test meter shall be used for testing ELCBs

m. Inspection of installations for fitness of ELCB prior to start of job shall be ensured. (Ref. **Format HSE-12**).

17.6.2 The following features shall also be ensured for all electrical installations during construction phase by the sub-contractor:

- Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 M. The main switch shall be connected to the point of supply by means of armoured cable.
- The outgoing feeders shall be double or triple pole switches with fuses / MCBs. Loads in a three phase circuit shall be balanced as far as possible and load on neutral should not exceed 20% of load in the phase.
- The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be HRC type. Use of rewirable fuses shall be strictly prohibited. The earth leakage device shall have an operating current not exceeding 30 mA.
- All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.
- All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.
- Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm2 copper shall be used for all single phase hand tools.
- Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.
- All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multi-strand wires / cables.
- Cables shall be free from any insulation damage.

- Minimum depth of cable trench shall be 750 mm for MV & control cables and 900 mm for HV cables. These cables shall be laid over a sand layer and covered with sand, brick & soil for ensuring mechanical protection. Cables shall not be laid in waterlogged area as far as practicable. Cable route markers shall be provided at every 25 M of buried trench route.
- When laid above ground, cables shall be properly cleated or supported on rigid poles of at least 2.1 M high. Minimum head clearance of 6 meters shall be provided at road crossings.
- Underground road crossings for cables shall be avoided to the extent feasible. In any case no underground power cable shall be allowed to cross the roads without pipe sleeve.
- All cable joints shall be done with proper jointing kit. No taped/temporary joints shall be used.
- An independent earthing facility should preferably be established within the temporary installation premises. All appliances and equipment shall be adequately earthed. In case of armoured cables, the armour shall be bonded to the earthing system.
- All cables and wire rope used for earth connections shall be terminated through tinned copper lugs.
- In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour.
- Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.
- ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

17.7 Welding/ Grinding/ Gas cutting

- Sub-contractor shall ensure that flash back arrestors conforming to BS:6158 or equivalent are installed on all gas cylinders as well as at the torch end of the gas hose, while in use.
- All cylinders shall be mounted on trolleys and provided with a closing key. Empty & filledup gas cylinders shall be stored separately with TAG, protecting them from direct sun or rain. Minimum 2 nos. of Portable DCP type fire extinguishers (10 kg) shall be maintained at the gas cylinder stores. Stacking & storing of compressed gas cylinders shall be arranged away from DG set, hot works, Elect. Panels / Elec. boards, etc.
- The burner and the hose placed downstream of pressure reducer shall be equipped with Flash Back Arrester/ Non Return Valve device.
- The hoses for acetylene and oxygen cylinders must be of different colours. Their connections to cylinders and burners shall be made with a safety collar.
- At end of work, the cylinders in use shall be closed and hoses depressurized.
- Cutting of metals using gases, other than oxygen &acetylene, shall require written concurrence from Owner.
- Grinding activity shall not be carried out in confined spaces without a valid work permit.
- All grinding/cutting machines shall be guarded and fitted with Dead-Man switch and this shall not be bypassed any time.
- All welding/grinding machines shall have effective earthing at least at distinctly isolated two points.
- In order to help maintain good housekeeping, and to reduce fire hazard, live electrode bits shall be contained safely and shall not be thrown directly on the ground.

- The hoses of Acetylene and Oxygen shall be kept free from entanglement & away from common pathways / walkways and preferably be hanged overhead in such a manner which can avoid contact with cranes, hydra or other mobile construction machinery.
- Hot spatters shall be contained / restricted appropriately (by making use of effective fire-retardant cloth/fabric) and their flying-off as well as chance of contact with near-by flammable materials shall be stopped.
- The Sub-contractor shall arrange adequate systems & practices for accumulation / collection of metal & other scraps and remnant electrodes and their safe disposal at regular interval so as to maintain the fabrication and other areas satisfactorily clean & tidy.
- All gas cylinders must have a cylinder cap on at all times when not in use. Cylinders shall be kept in vertical position only with proper support and shall not be rolled/ dropped at all. It shall be stored in a covered and ventilated space. Steel cage shall be used to carry cylinders to and from height. Only industrial grade of gas shall be used.
- Grinding machines shall have wheel guards and the cutting wheels shall be within expiry date and free from crack or any defect.

17.8 Ergonomics and tools & tackles

- The Sub-contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health. There shall be an experienced Lifting Supervisor/Signal Man deployed for lifting a load to a height. The rigger shall also be adequately experienced. The sub-contractor shall provide sufficient **walky-talky** to the lifting supervisor and rigger at a height/distance where these persons cannot communicate clearly due to noise level/distance.
- All lifting tools, tackles, equipment, trailers, trucks/dumpers, accessories including cranes shall be tested periodically by statutory/competent authority for their condition and load carrying capacity. Valid test & fitness certificates from the applicable authority shall be submitted to BHEL & Owner/EIL for their review/acceptance before the lifting tools, tackles, equipment, trailers, trucks/dumpers, accessories and cranes are used. All the cranes and lifting tools & tackles shall be inspected on daily basis and as well as formal monthly by The last date of Third Party Inspection and the next Due date shall be conspicuously displayed on all cranes. A copy of certificate shall be pasted on operator's cabin of all the lifting equipment.
- Load testing of Cranes must be made mandatory after each modification/alteration of crane configuration/change in boom length.
- The sub-contractor shall not be allowed to use defective equipment or tools not adhering to safety norms.
- Sub-contractor shall arrange non-sparking tools for project construction works in operating plant areas / hydrocarbon prone areas.
- Wherever required the Sub-contractor shall make use of Elevated Work Platforms (EWP) or Aerial Work Platforms (mobile or stationary) to avoid ergonomical risks and workmen shall be debarred to board such elevated platform during the course of their shifting/ transportation.
- Sub-contractor shall ensure installation of Safe Load Indicator (SLI) on all cranes (while in use) to minimize overloading risk. SLI shall have capability to continuously monitor and display the load on the hook, and automatically compare it with

the rated crane capacity at the operating condition of the crane. The system shall also provide visual and audible warnings at set capacity levels to alert the operator in case of violations.

- The sub-contractor shall be responsible for safe operations of different equipment's mobilized and used by him at the workplace like transport vehicles, engines, cranes, mobile ladders, scaffoldings, work tools, etc.
- The Sub-contractor shall arrange periodical training for the operators of hydra, crane, excavator, mobile machinery, etc. at site by utilizing services from renowned manufacturers.
- The manufacturer's instruction for maintenance shall also be followed. All safety measures shall be followed. All tools tackles, lifting appliances; material-handling equipment etc. used by the contractor shall be of safe design and construction. The operators, slingers and signalers shall be qualified as per IS 13367 (part-1):2003 "Safe use of cranes- code of practices". There shall be a person responsible for co-ordination among cranes where multiple cranes are used, and lifting over 75% of the crane capacity to be avoided.

15.7.1 Color Coding Procedure

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

Colour code of Inspection Tag

S. No	Months	Colour
1	January / July	RED
2	February / August	GREEN
3	March / September	ORANGE
4	April / October	YELLOW
5	May / November	BLUE
6	June / December	PINK

-
- The cycle of colors shall be Monthly. The color code tape / Sticker shall be clearly visible to designate the period for which the inspections and tests were conducted.
- Following the initial inspection, the equipment must be color-coded quarterly as per color-coding instructions that will be issued by the SUB-CONTRACTOR.
- Fire extinguisher with the current month color-coding inspection sticker must be provided and secured in the platform.
- All slings shall be regularly inspected in accordance with the requirement of the project for frequent and periodic inspections and removed from the job site if they fail to meet the minimum requirements of the project.
- The CONTRACTOR'S SFO shall ensure that all PPE is inspected prior to its issue. He is to ensure all SUBCONTRACTOR personnel are using safe and proper PPE equipment. Regular inspections on the PPE shall be carried out and personnel not adhering to those inspections shall be removed immediately from the SITE.
- A five (5) day interval period shall be given into each monthly color code change. During this five (5) day period either color shall be acceptable.

17.9 Occupational Health

The sub-contractor shall identify all operations that can adversely affect the health of its workers and issue & implement mitigation measures.

- For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.
- To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.
- Appropriate respiratory protective devices (hood with respiratory devices) shall be used to protect workmen from inhalation of air borne contaminants like silica, asbestos, gases, fumes, etc.
- Workmen shall be made aware of correct methods for lifting, carrying, pushing & pulling of heavy loads. Wherever possible, manual handling shall be replaced by mechanical lifting equipment's.
- For jobs like drilling/demolishing/dismantling where noise pollution exceeds the specified limit of 85decibels, ear muffs shall be provided to the workers.
- To avoid work related upper limb disorders (WRULD) and backaches, Display Screen Equipment's' workplace stations shall be carefully designed & used with proper sitting postures. Power driven hand-held tools shall be maintained in good working condition to minimize their vibrating effects and personnel using these tools shall be taught how to operate them safely & how to maintain good blood circulation in hands.
- The Sub-contractor shall arrange health check-up (by registered medical practitioner) for all the workers at the time of induction. Health check may have to be repeated if the nature of duty assigned to him is changed necessitating health check or doubt arises about his wellness. BHEL reserves the right to ask the sub-contractor to submit medical test reports. Regular health check-ups are mandatory for the workers assigned with Welding, Radiography, Blasting, Painting, Heavy Lift and Height (>2m) jobs. All the health check-ups shall be conducted by registered Medical practitioner and records are to be maintained by the Sub-contractor.
- The Sub-contractor shall arrange Medical Camps at regular intervals at work sites and labor colonies to assess health condition of workers.
- The Sub-contractor shall ensure vaccination of all the workers during the course of entire project span.

17.10 Hazardous substances

- Hazardous, inflammable and/or toxic materials such as solvent coating, thinners, anti-termite solutions, water proofing materials shall be stored in appropriate containers preferably with lids having spillage catchment trays and shall be stored in a good ventilated area. These containers shall be labelled with the name of the materials highlighting the hazards

associated with its use and necessary precautions to be taken. Respective MSDS (Material Safety Data Sheet) shall be made available at site & may be referred whenever problem arises.

- Where contact or exposure of hazardous materials are likely to exceed the specified limit or otherwise have harmful effects, appropriate personal protective equipment's such as gloves, goggles/face-shields, aprons, chemical resistant clothing, respirator, etc. shall be used.
- The work place shall be checked prior to start of activities to identify the location, type and condition of any asbestos materials which could be disturbed during the work. In case asbestos material is detected, usage of appropriate PPEs by all personnel shall be ensured and the matter shall be reported immediately to BHEL

17.11 Slips, trips & falls

The sub-contractor shall establish a regular cleaning and basic housekeeping programme that covers all aspects of the workplace to help minimize the risk of slips, trips & falls. The sub-contractor shall take positive measures like keeping the work area tidy, storing waste in suitable containers & harmful items separately, keeping passages, stairways, entrances & exits especially emergency ones clear, cleaning up spillages immediately and replacing damaged carpet/ floor tiles, mats & rugs at once to avoid slips, trips & falls.

Grating removal permit system should be implemented during construction phase. So that after permanent gratings are installed on platforms and tech structure floors; removal of any gratings for whatever purpose (including for lifting piping material etc.) is required to be sanctioned by signed permit by HSE officers of both sub-contractor and Engineer-in-charge. The spot where gratings are removed shall be hard-barricaded during course of work. The removed gratings shall be re-installed immediately after completion of work or at the time of cessation of work every day whichever is earlier and the permit shall be closed on daily basis. A register shall be maintained for recording all the grating removal permits and their closure shall be monitored on daily basis.

17.12 Radiation exposure

- All personnel exposed to physical agents such as ionizing & non-ionizing radiation, including ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with the type of exposure involved.
- For Open Field Radiography works, requirements of Bhabha Atomic Research Centre (BARC)/ Atomic Energy Regulatory Board (AERB) shall be followed. There shall be requisite approval of the agency by BARC and the same shall be furnished to BHEL prior to requesting for work permit.
- The Sub-contractor shall implement an effective system of control (as described in the AERB regulations) at site for handling radiography-sources & for avoiding its misuse & theft.
- The sub-contractor shall generate the Format No: HSE-8 "Permit for radiation work" before start of work.
- Radiography shall be carried out in night time only. In exceptional case, the radiography work has to be carried out at day time, suitable methodology to be used so that other works, people are not affected.

17.13 Explosives/Blasting operations

- Blasting operations shall be carried out as per latest Explosive Rules (Indian/ International) with prior permission. The Sub-contractor shall obtain license from Chief Controller of Explosives (CCoE) for collection, transportation, storage of explosives as well as for carrying out blasting operations.
- The Sub-contractor shall prepare exclusive method statement (in cognizance with statutory requirements) for diffusing unfired explosives, if any, at project site before carrying out actual task. Nowhere blasting shall be carried out by the Sub-contractor or its agency without the involvement of competent supervisor and licensed blaster / shot blaster.

17.14 Demolition/ Dismantling

- The sub-contractor shall adhere to safe demolishing/ dismantling practices at all stages of work to guard against unsafe working practices.
- The sub-contractor shall disconnect service lines (power, gas supply, water, etc.)/ make alternate arrangements prior to start of work and restore them, if required as directed by EIL/ Owner at no extra cost.
- Before carrying out any demolition/dismantling work, the sub-contractor shall take prior approval of EIL/Owner and generate the Format No.HSE-9. For revamp jobs in operating plants where location of underground utilities is not known with certainty, the sub-contractor shall depute an experienced engineer for supervision and shall make adequate arrangements for fire-fighting & First-Aid during the execution of these activities.
- The Sub-contractor shall arrange approved HIRAC / Method Statement for the specific demolition / dismantling task and corresponding action plan commensurate with hazards / risks associated therein. In no case any activity related to demolition / dismantling shall be carried out by the Sub-contractor without engaging own supervision / field engineer.

17.15 Road Safety

- The Sub-contractor shall ensure adequately planned road transport safety management system.
- The vehicles shall be fitted with reverse warning alarms & flashing lights / fog-lights and usage of seat belts shall be ensured.
- The Sub-contractor shall also ensure a separate pedestrian route for safety of the workers and comply with all traffic rules & regulations, including maintaining speed limit of 20 KMPH or indicated by owner for all types of vehicles / mobile machinery. The maximum allowable speed shall be adhered to.
- In case of an alert or emergency, the Sub-contractor must arrange clearance of all the routes, roads, access. The Sub-contractor shall deploy sufficient number of traffic controllers at project site routes / roads/ accesses, to alert reversing movement of vehicles & machinery as well as pedestrians.
- Dumpers, Tippers, etc. shall not be allowed to carry workers within the plant area and also to & from the labour colony to & from project sites.
- **Hydras of model-F-15 or TRX or equivalent design** shall only be allowed for handling the materials at fabrication/ storage yards and in no case shall be allowed to transport the materials over project / plant roads.It shall be used only for loading and unloading of materials and marching shall be restricted to 10metre only. There shall be one FLAGMAN

with Red and Green flags, attached to each crane. Back-hoe shall not be used for shifting/lifting of materials other than what it is meant for.

- The Sub-contractor shall not deploy any such mobile machinery / equipment, which do not have competent operator and / or experienced banks-man/ signal-man. Such machinery/ equipment shall have effective limit-switches, reverse-alarm, front & rear-end lights etc. and shall be maintained in good working order.
- The Sub-contractor shall not carry-out maintenance of vehicles / mobile machinery occupying space on project / plant roads and shall always arrange close supervision for such works.
- For pipeline jobs, the sub-contractor shall submit a comprehensive plan covering transportation, loading / unloading of pipes, movement of side booms, movement of vehicles on the ROW, etc.
- Sub-contractor shall arrange/ install visible road signs, diversion boards, caution boards, etc. on project roads for safe movement of men and machinery.

17.16 **Confined Space Entry**

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

The sub-contractor shall generate a work permit (Format No. HSE -7) before entering a confined space. People, who are permitted to enter into confined space, must be medically examined & certified by registered doctor, confirming their ‘medical fitness for working in confined space’. All necessary precautions mentioned therein shall be adhered to. An

attendant shall be positioned outside a confined space for extending help during an emergency. Effective communication shall be maintained between personnel in confined space and outside by combination of visual/voice or portable radio. Compressed gas cylinders shall not be taken into confine space. Entry Register for confined space to be maintained with the name and time of entry/exit. All appropriate PPEs and air quality parameters shall be checked before entering a confined space. It shall be ensured that the piping of the equipment which has to be opened is pressure- free by checking that blinds are in place, vents are open and volume is drained. Inside confined space works, only electrical facilities/ installations of 24V shall be permitted. Contactor shall ensure usage of safe & suitable arrangement of oxygen supply for individual workmen (during the course of work in confined space), if oxygen concentration is found to be less than 19.5% (v/v) there.

The confined space shall be cleared off all cables, machines, cylinders, materials at the end of the day's work as far as possible.
Once the confined space work has been completed, the entry permit must be cancelled. A copy of the cancelled permit must be given to the HSE Manager.

17.17 Heavy Lifts

- The sub-contractor shall submit detailed rigging studies plan for BHEL & EIL/ Owner approval prior to lifting equipment which cannot be erected with a crane of approx. 100 MT capacity due to constraints of its dimensions, location of foundation height, approach & weight.
- Apart from above, in following cases also, rigging studies plan to be submitted:
    - Lifts or movements over 50 tons
    - Lifting over 75% of crane capacity
    - Lifts over operating units/equipment
    - Other instances deemed prudent by the Company.
    - Lifts or movements of unusual difficulty, geometry or rigging.
    - Where required by contract.
    - Lifting a Personnel Basket.
    - 2-crane lift operations (least desirable).
- Sub-contractor shall generate the format no:HSE-15 "Permit for heavy lift/critical erection"
- The Safe Working Load (SWL) and manufacturer's serial numbers shall be clearly marked on the slings and the lifting gears, either by tagging, stamping, engraving or embossing.
- Prior to actual lifting activities, sub-contractor shall check the validity of the crane inspection certificate issued by statutory/ competent authority. This requirement shall also apply to all rigging equipment's utilized for the job.
- The sub-contractor shall, at all times, be responsible for all rigging activities.
- The Sub-contractor shall ensure medical fitness of all workmen who are engaged / involved in erection of equipment's, vessels etc. and such fitness checks shall be carried-out every six months interval with the help of a registered medical practitioner & record shall be maintained
- Adequate safety measures such as positive barricading, usage of appropriate PPEs, permit to work, etc. shall be taken during all heavy or critical lifts.

- For lifting any material (irrespective of shape, size or volume), at any height, it is always advisable to prepare a Plan of Erection (PoE) taking into consideration hazards & risks associated therein – this can enable people to put their own experiences of various natures & side-by-side establish a practical method for risk-free erection / lifts. The sub-contractor shall prepare PoE & shall document the same, when risks are identified as "medium" or "high" and the same shall be approved by its competent / qualified engineer.

17.18 Civil works:

The Sub-contractor shall obtain permission from competent authorities prior to excavation wherever required.

The Sub-contractor shall locate the position of buried utilities (water line, cable route, etc.) by referring to project / plant drawing / in consultation with EIL/Owner. The Sub-contractor shall start digging manually to locate the exact position of buried utilities & thereafter use mechanical means.

The Sub-contractor shall keep soil heaps at least 1.5 M away from edge or a distance equal to depth of pit (whichever is more).

All excavated pits greater than 10 Sq.M plan area and depth more than 1.5M shall have at least two access routes for ingress and egress. Also, additional access routes shall be provided such that distance between any two access routes shall not be more than 20M.

The Sub-contractor shall maintain sufficient "angle of repose" during excavation – shall also provide slope or suitable bench as decided by EIL / Owner.

The Sub-contractor shall arrange "battering" or "benching" wherever required for preventing collapse of edge of excavations.

The Sub-contractor shall identify & arrange de-watering pump or well-point system to prevent earth collapse due to heavy rain / influx of underground water.

The Sub-contractor shall arrange protective fencing/ barricading with warning signal around excavated pits, trenches, etc. along with minimum 2 (two) entries, exits/ escape ladders.

The Sub-contractor must avoid "underpinning" / under-cutting to prevent collapse of chunk of earth during excavation

The Sub-contractor shall use "stoppers" to prevent over-run of vehicle wheels at the edge of excavated pits/ trenches.

The Sub-contractor shall arrange strengthening of "shoring" & "strutting" proactively to avoid collapse of earth/ edges due to vehicular movement in close proximity of excavated areas/ pits/ trenches, etc.

17.18.1 EXCAVATION

Excavation is the essential element of the construction process for making foundations, drainage work and site re-grading of all kinds.

In carrying out excavations the soil condition can vary widely, often in short distances. No soil whatever its nature can be relied upon to support its own weight for any length of time. Even a small fall of earth is capable of inflicting serious injury even if it does not kill. Unless and until the excavation is battered, the sides need supporting to prevent the possibility of collapse.

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

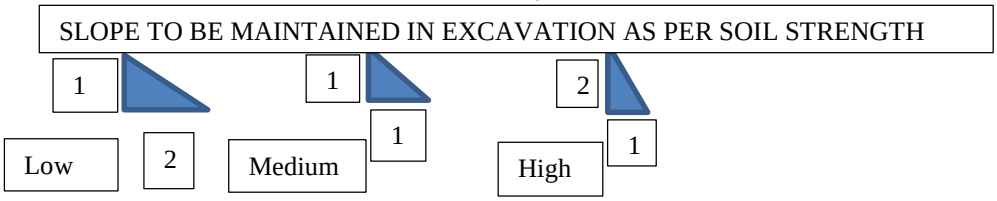
• Check for underground utilities like electrical / telephone cables, sewage, water lines and proper care has to be exercised to protect and prevent damage to it

• Proper and adequate slope is maintained while excavating

• Adequate shoring or sheeting is done wherever require to prevent soil sliding

• Safe access through ladder or steps for exit & entry to excavation

- No material /excavated soil is kept within one meter from the edge
- Safe way is planned and provided for movement of HEM /transport equipment near excavation
- Safety helmet and shoes/gum boots are provided and worn by the workmen at excavation works
- Hard Barricade using pipes or structural is provided around excavated pits
- Danger signs /Caution boards are displayed at work spot
- Dewatering arrangement is made where water seepage is prevailed.
- Stop blocks are provided to avoid vehicles reversing into the excavated trenches



17.18.2 Piling

It is the first and foremost activity of construction where load bearing capacity of soil is inadequate for foundation. The working condition of piling rig and other associated tackles is a significant contributing factor for prevention of equipment failure during operation.

Ensure the following precautionary measures before starting piling works

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

17.18.3 Mobile Plant

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

Many potentially hazardous situations and accidents could be avoided by the application of known safety principles and procedures

Safety measures:

1. Where movement around site is involved, routes should be planned, obstruction free and well maintained
2. Observe specified speed limits
3. Operating personnel should be aware of associated risks and its preventive measures
4. Only experienced, trained and authorized persons with valid license (wherever applicable) should operate the mobile equipment/vehicles
5. Provide and use Warning lights and reverse horn for cautioning the people around
6. Operation should be on level and stable ground with adequate working clearance.
7. Loading of out riggers/stabilizers should be well within safe ground bearing capacity
8. No person should be on equipment or vehicle during loading and unloading of material

9. Operators should be protected by warning barriers or switching off power when working in close proximity of overhead power lines
10. The equipment /vehicles should be well maintained and provided with effective brake system and other safety devices (wherever require)
11. Rotating parts of equipment should be adequately guarded
12. Provide necessary personal protective appliances and ensure its use by the operating personnel Ensure effective measures at source to control harmful emissions, dust, fumes contaminating atmosphere and cause health hazards to the operators and people in the vicinity.
13. No overloading/over stressing of vehicles/plant is allowed
14. Hoses, pipes, and receivers' gauges and valves involved in carrying out hydraulic fluid/ compressed air should be checked for leaks and tested prior to operation.
15. Adequate safe clearance for swing and movement is to be judged during operation
16. Operator leaving work spot should ensure that the equipment/vehicle is kept in neutral position and place on firm and level ground.
17. The hand brake should be kept in position and block road wheels as additional safety measure
18. Blades/buckets should be kept low while moving
19. The dozer blades should not be used as brakes except in emergency
20. The ground should be examined for its bearing capacity and general safety especially when operating road roller at the edges of slopes, embankments.
21. The roller should not be moved downhill with the engine out of gear
22. If operating near excavations the following precautionary measures are to be ensured
23. Barricading, edge protection to prevent fall of persons/vehicles over running while reversing etc.
24. Suitable support system and adequate allowance to avoid the danger of side collapsing
25. Experienced signaler /attendant should be always accompanied with operator/driver for proper direction /signal and also to caution others in the working Zone during operation of mobile plant

17.18.4 Concrete Vibrators

• Revolving parts/belt drives should be adequately guarded and Vibrating unit shall be completely enclosed
• Electrically operated compact Vibrators is of completely enclosed type having suitable overload relays and effectively earthed
• Ensure sufficient length of cable to the Vibrator.
• Ensure electric starters and other accessories are firmly fixed adequately supported
• Ensure locking of needle load while inserting needle in to the vibrator,
• Ensure periodical lubrication and maintenance

17.18.5 Concrete mixture

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

18.0 Welfare measures

Sub-contractor shall, at the minimum, ensure the following facilities at work sites:

- A crèche at site where 10 or more female workers are having children below the age of 6 years.
- Adequately ventilated / illuminated rooms at labour camps & its hygienic up-keeping.
- Reasonable canteen facilities at site and in labour camps at appropriate location depending upon site conditions. Sub-contractor shall make use of "industrial" variety of LPG cylinder & satisfactory illumination at the canteens. Necessary arrangement for efficient disposal of wastes from canteens & urinals /toilets shall also be made and regular review shall be made to maintain the ambience satisfactorily hygienic &shall also comply with all applicable statutory requirements.
- Adequately lighted & ventilated Rest rooms at site (separate for male workers and female workers). None shall be allowed to take lunch or rest in open space or in work area. It should accommodate at least 30% of total strength of workmen.

- Provision for suitable mobile toilets to be made available by Sub-contractor for remote/scattered job locations.
- Urinals, Toilets, drinking water, washing facilities, adequate lighting at site and labour camps, commensurate with applicable Laws/ Legislation.
- VISAKHAPATNAM IS A COASTAL BELT SITE AND HEAVY RAIN AND CYCLONIC WEATHER ARE QUITE COMMON. HENCE ALL CIVILSTRUCTURES SHALL BE ERECTED SO AS TO WITHSTAND SUCH HEAVY RAIL LOAD AND WINDLOAD.

18.1 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 at least once in 1 month indicating date of cleaning and next due date. Mild cleaning detergents as used for cleaning vessels shall be applied and scrubbers (3M or equivalent) shall be used for removing scales and deposits on the inside surface. The tank shall be thoroughly cleaned with potable water only before it is refilled.
- Employees should use their own cup for collecting water-no cup shall be shared
- Potability of water should be tested as per IS10500 at least every six months.

18.2 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.
- If water used for washing is not potable, it shall be marked “Do Not Drink” in English, Hindi and local language

18.3 LATRINES AND URINALS

- Latrines and urinals shall be provided in every work place based on strength of workmen at the rate of one toilet seat and one urinal for every 40 workmen or part thereof (not less than 20).
- Urinals shall also be provided at different elevations.
- They shall be adequately illuminated and shall be maintained in a clean and hygienic condition at all times, by appointing designated person.

- Separate facilities shall be provided for the use of male and female worker if any.
- Hand-wash facility shall be provided.
- Bio-toilets shall be preferred

18.4 PROVISION OF ACCOMODATION/LABOUR COLONY

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

18.5 PEST CONTROL

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

18.6 Illumination:

- Each phase of construction will create its own illumination and lighting challenges; whether the work is related to confined spaces, hazardous atmospheres, stairways, pedestrian walkways or night work. Proper and adequate illumination is critical in order to perform the work in a safe and healthy manner. The following are the minimum requirements: Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.

- Temporary lighting used in damp and / or hazardous locations and confined areas must be of not more than 24 volts.

- Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp. Broken and burnt-out bulbs must be replaced immediately.

- Emergency lighting provision for night work shall be made to minimize danger in case of main supply failure.

- Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II). Some recommended values are given below:

S. No.	Location	Illumination(Lux)
A.	**Construction Area**	

1.	Outdoor areas like store yards, entrance and exit roads	20
2.	Platforms	50
3.	Entrances, corridors and stairs	100
4.	General illumination of work area	150
5.	Rough work like fabrication, assembly of major items	150
6.	Medium work like assembly of small machined parts rough measurements etc.	300
7.	Fine work like precision assembly, precision measurements etc.	700
8.	Sheet metal works	200
9.	Electrical and instrument labs	450

B. Office

1.	Outdoor area like entrance and exit roads	20
2.	Entrance halls	150
3.	Corridors and lift cars	70
4.	Lift landing	150
5.	Stairs	100
6.	Office rooms, conference rooms, library reading tables	300
7.	Drawing table	450
8.	Manual telephone exchange	200

19.0 Environment Protection

- Sub-contractor shall ensure proper storage and utilization methodology of materials that are detrimental to the environment. Where required, Sub-contractor shall ensure that only the environment friendly materials are selected and emphasize on recycling of waste materials, such as metals, plastics, glass, paper, oil & solvents. The waste that cannot be minimized, reused or recovered shall be stored in the area earmarked for such purpose. Disposal shall be as per instruction by BHEL.. In no way, toxic spills shall be allowed to percolate into the ground. The sub-contractor shall not use the empty areas for dumping the wastes outside identified scrap yard. All hazardous material shall be kept in a covered and well ventilated space with cemented flooring so as to prevent leaching into soil. Wherever such liquid material is stored, a secondary containment shall be provided so that any spill is contained. There shall be sand buckets, cotton waste, cotton cloths in such storage area so that in case of any spillage, the same shall be promptly cleaned up and the used sand/ cloths soaked with the spill shall be treated as hazardous as well and stored/ disposed off accordingly.
- The sub-contractor shall strive to conserve energy and water wherever feasible.
- The sub-contractor shall ensure dust free environment at workplace by sprinkling water on the ground in its work area and also in common area, if so instructed by BHEL at frequent intervals. The air quality parameters for dust, poisonous gases, toxic releases, harmful radiations, etc. shall be checked by the sub-contractor on daily basis and whenever need arises.
- The sub-contractor shall not be allowed to discharge chemicals, oil, silt, sewage, sullage and other waste materials directly into the controlled waters like surface drains, streams, rivers, ponds. A discharge plan suggesting the methods of treating the waste before discharging shall be submitted to BHEL for approval.

19.1 **Noise Mitigation**

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

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

Noise Level Chart

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

20.0 Rules & Regulations

All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulations relating to the hazardous materials, substances and wastes. Sub-contractor shall not dump, release or otherwise discharge or disposes off any such materials without the express authorization of EIL/Owner. An indicative list of Statutory Acts & Rules relating to HSE is given under Appendix-D.

21.0 Weather Protection

Sub-contractor shall take appropriate measures to protect workers from severe storms, rain, solar radiations, poisonous gases, dust, etc. by ensuring proper usage of PPEs like Sun glasses, Sun screen lotions, respirators, dust masks, etc. and rearranging/ planning the construction activities to suit the weather conditions. Effective arrangement (without creating inconvenience to project facilities & permanent installations) for protecting workmen from hailstorm, drizzle in the form of temporary shelter shall be made at site.

22.0 Communication

22.1 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.
- 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.

22.2 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.

All persons deployed at the work site shall have access to effective means of communication so that any untoward incident can be reported immediately and assistance sought by them.

All health & safety information shall be communicated in a simple & clear language easily understood by the local workforce.

23.0 Key Performance Indicators

The sub-contractor shall measure an activity in both leading & trailing indicators for statistical and performance measurement. The activities pertaining to key performance indicators are covered in Monthly HSE Report (Format No. HSE-5). The sub-contractor shall try to achieve a statistically fair record and strive for its continual improvement.

Leading Indicators viz :-

- Number of Safety Inductions carried-out at site (for workmen & staff members)
- Number of HSE inspections carried out
- Number of “Safety Walk Through” carried-out by site-head.
- Number of HSE shortfalls / lapses identified per sub-contractor& closed-out in time.
- Number of Safety Meetings conducted (in-house / with sub-contractors)
- Number of HSE Audits made (internal & external) vis-à-vis non conformances raised
- Number of HSE Awareness / Motivational program conducted by sub-contractors
- Number of HSE Trainings conducted at site for supervisors & workmen
- Study of Near miss case reported
- Encouragements / Awards / Recognitions to workmen, job supervisors & field engineers.
- Suggestions for improvement

Trailing Indicators viz :-

- Calculation of HSE statistics viz frequency rate, severity rate, LTA free manhours, etc.
- Analysis of incidents / accidents (nature, severity, types etc.)
- Study of Incident / Accident with respect to :-

 Variety

 Period of the year / project span

- Timings of the incident / accident
- Age profile of victims
- Body parts involved
- Penalty levied for causing incident / accident

24.0 Unsuitable Land Conditions

Sub-contractor shall take appropriate measures and necessary work permits/clearances if work is to be done in or around marshy areas, river crossings, mountains, monuments, etc. The Sub-contractor shall make right assessment and take all necessary action for developing work areas to make them safe & suitable for crane operations or other vehicular movement before carrying out any project related activity / operation. Sub-contractor shall take all necessary actions to make the surroundings of its site establishments (site office, stores, lay-down area etc.) work-worthy safe and secure.

25.0 Under Water Inspection

Sub-contractor shall ensure that boats and other means used for transportation, surveying & investigation works shall be certified seaworthy by a recognized classification society. It shall be equipped with all life saving devices like life jackets, adequate fire protection arrangements and shall posses communication facilities like cellular phones, wireless, walkie-talkie. All divers used for seabed surveys, underwater inspections shall have required authorized license, suitable life saving kit. Number of hours of work by divers shall be limited as per regulations.

EIL/ Owner shall have the right to inspect the boat and scrutinize documents in this regard.

26.0 Tool Box Talks (TBT)

Sub-contractor shall conduct daily TBT with workers prior to start of work and shall maintain proper record of the meeting. A suggested format is given below. The TBT is to be conducted by the immediate supervisor of the workers

The Sub-contractor shall conduct TBT before start of every morning or evening shift or night shift activities, for alerting the workers on specific hazards and their appropriate dos & don'ts. The Sub-contractor shall provide sufficient rests to the site workmen and their foremen to avert fatigue & thereby endangering their lives during the course of site works.

TOOLBOX TALK RECORDING SHEET		
Date & Time		
Work Location		
Subject (Nature of work)		
Presenter		
Hazards involved		
Precautions to be taken		
Worker's Name	Signature	Section

Remarks, in any		

The topics during TBT shall include

- Hazards related to work assigned on that day and precautions to be taken.
- Any forthcoming HSE hazards/events/instruction/orders, etc.

The above record can be kept in local language, which workers can read. These records shall be made available to EIL/ Owner whenever demanded.

27.0 Training & Induction Programme

- Initial induction of workers into Construction oriented activities and appraising them about the methodology of works and how to carry-out safely and the same should not be inter mixed with Tool Box Talks or HSE Training. In this regard careful action should be made & maintained for imparting HSE induction to every individual, irrespective of his task/designation/level of employment, whereas, HSE Training should be imparted to specific person/group of people who are to carry-out that specific task more than once – for example, Riggers must be trained for working at heights, welders must be trained for work in confined space, fitters/carpenters, mesons must be trained for work at heights, etc.
- Sub-contractor shall conduct Safety induction programme on HSE for all his workers and maintain records. The Gate Pass shall be issued only to those workers who successfully qualify the Safety induction programme.
- The Sub-contractor shall brief the visitors about the HSE precautions which are required to be taken before their proceeding to site and make necessary arrangements to issue appropriate PPEs like Aprons, hard hats, ear-plugs, goggles & safety shoes etc., to his visitors. The Sub-contractor shall always maintain relevant acknowledgement from visitor on providing him brief information on HSE actions.
- Sub-contractor shall ensure that all his personnel possess appropriate training to carry out the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about

- Potential hazards to which they may be exposed at their workplace
- Measures available for prevention and elimination of these hazards

The topics during training shall cover, at the minimum: -

- Why safety should be considered during work - explanation
- Education about hazards and precautions required
- Employees' duties & responsibilities
- Emergency and evacuation plan
- HSE requirements during project activities

- Fire fighting and First-Aid
- Use of PPEs
- Occupational health issues – dos & don'ts
- Local laws on intoxicating drinks, drugs, smoking in force
- Common environmental subjects – lighting, ventilation, vibration, smoke/fumes etc.

- Records of the training shall be kept and submitted to BHEL
- The Sub-contractor shall make regular program for conducting Safety Training on various topics related to various activities & their safe-guarding utilizing experienced persons / outside agency / faculty. A program for Safety Training (indicative list as per Appendix –F) shall be furnished by the Sub-contractor in its HSE Plan.

28.0 ADDITIONAL SAFETY REQUIREMENTS FOR WORKING INSIDE A RUNNING PLANT

As a minimum, the sub-contractor shall ensure adherence to following safety requirements while working in or in the close vicinity of an operating plant:

a) Sub-contractor shall obtain permits for Hot work, Cold work, Excavation and Confined Space from Owner in the prescribed format.

b) The sub-contractor shall monitor record and compile list of his workers entering the operational plant/unit each day and ensure & record their return after completing the job.

c) Sub-contractor's workers and staff members shall use designated entrances and proceed by designated routes to work areas only assigned to them. The workers shall not be allowed to enter units' area, tanks area, pump rooms, etc. without work authorization permit.

d) Work activities shall be planned in such a way so as to minimize the disruption of other activities being carried out in an operational plant/unit and activities of other sub-contractors.

e) The sub-contractor shall submit a list of all chemicals/toxic substances that are intended to be used at site and shall take prior approval of the Owner.

f) Specific training on working in a hydrocarbon plant shall be imparted to the work force and mock drills shall be carried out for Rescue operations/First-Aid measures.

g) Proper barricading/cordoning of the operational units/plants shall be done before starting the construction activities. No unauthorized person shall be allowed to trespass. The height and overall design of the barricading structure shall be finalized in consultation with the Owner and shall be got approved from the Owner.

h) Care shall be taken to prevent hitting underground facilities such as electrical cables, hydrocarbon piping during execution of work.

i) Barricading with water curtain shall be arranged in specific/critical areas where hydrocarbon vapors are likely to be present such as near horton spheres or tanks. Positioning of fire tenders (from owner) shall also be ensured during execution of critical activities.

j) Emergency evacuation plan shall be worked out and all workmen shall be apprised about evacuation routes. Mock drill operations may also be conducted.

k) Flammable gas test shall be conducted prior to any hot work using appropriate measuring instruments. Sewers, drains, vents or any other gas escaping points shall be covered with flame retardant tarpaulin.

l) Respiratory devices shall be kept handy while working in confined zones where there is a danger of inhalation of poisonous gases. Constant monitoring of presence of Gas/Hydrocarbon shall be done.

m) Clearance shall be obtained from all parties before starting hot tapping, patchwork on live lines and work on corroded tank roof.

n) Positive isolation of line/equipment by blinding for welding/cutting/grinding shall be done. Closing of valve will not be considered sufficient for isolation.

o) Welding spatters shall be contained properly and in no case shall be allowed to fall on the ground containing oil. Similar care shall be taken during cutting operations.

p) The vehicles, cranes, engines, etc. shall be fitted with spark arresters on the exhaust pipe and got it approved from Safety Department of the Owner.

q) Plant air should not be used to clean any part of the body or clothing or use to blow off dirt on the floor.

r) Gas detectors should be installed in gas leakage prone areas as per requirement of Owner's plant operation personnel.

s) Experienced full time safety personnel shall be exclusively deployed to monitor safety aspects in running plants.

29.0 Self Assessment and Enhancement

The sub-contractor shall develop a method of check & balance through self assessment & enhancement techniques and shall explore the opportunities for continual improvement in the HSE system.

30.0 HSE Promotion

The sub-contractor shall encourage his workforce to promote HSE efforts at workplace by way of organizing workshops/ seminars/ training programmes, celebrating HSE awareness weeks, monthly Safety day &National Safety Day, conducting quizzes & essay competitions, distributing pamphlets, posters & material on HSE, providing incentives for maintaining good HSE practices and granting incentives / bonus for completing the job without any lost time accident. While the sub-contractors are welcome to carryout HSE promotion independently, they shall have to participate in joint programmes as well. In this case, expenses shall be proportionately borne by the sub-contractors.

31.0 Lock Out and Tag Out (LOTO) for Isolation of Energy Source

- Sub-contractor shall follow the LOTO/ Isolation procedure of owner for all energy source isolations installed/under purview by/of owner i.e. “Brown field”

- For all the other energy source (not under purview of client/owner) i.e. “Green field” Sub-contractor shall develop a system to ensure the isolation of equipments, pipelines, Vessel, electrical panels from the energy source covering following as minimum:-

  - Identification of all energy source viz electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravitational, radiation and other forms of stored or kinetic energy.

  - Establishing the energy isolation devices viz: manually operated electrical circuit breakers, disconnection switches, blind flanges, etc.

  - Installation of Lock Out devices for preventing the inadvertent release of stored energy and Tag Out devices (“Danger”, “Do Not operate” or Do not Remove” tags) to indicate that testing, maintenance or servicing is underway and the device cannot be operated until the tag out device is removed.

  - Lock Out and Tag out log book

  - Permit for isolation and de-isolation of energy source as per format NO: HSE-16

  - Availability of competent persons like experienced operators at substations, pump house, units, etc, supervisors etc.
- Sub-contractor shall ensure that all the sources are locked out and tagged properly before giving clearance to start the job.
- After the completion of job, sub-contractor shall ensure all tools and tackles are removed and nobody is present in the working area and signing on LOTO log book.
- Only on confirmation of above the sub-contractor will remove their lock and tag from the isolation points and give instructions for energizing the same. Only the person carrying out the task shall himself carry the key for the lock in /Lock out.

32.0 EMERGENCY PREPAREDNESS AND RESPONSE (Preferably to be maintained jointly by all stake-holders in the project) Emergency preparedness and response plan requirements are to protect worker life and health, and to safeguard property used and stored on the project. This plan is prepared in anticipation of an emergency to prevent losses to any Incident. This plan describes how the organization identifies, respond to and review emergency situations.

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

34.1 Definition:

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

34.2 Emergency scenarios and General Guidelines:

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

- Personal injuries:
  In spite of putting best efforts some technical failure or human error may lead to personal injury at site. Guidelines are given below when personnel injuries happen:
  - Contact medical center over phone/cell/radio;

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

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

- Mishaps involving failures of crane, structures, equipment and vehicular incidents, etc., can also lead to an Emergency situation on construction sites. Guidelines for actions to be taken in case of such situations are as:
  - Inform immediate authority and also inform security and safety departments.
  - Try to assist in rescue personnel involved only if safe to do so;
  - Cordon off the area to prevent entry of personnel in affected area;
  - Security shall ensure movement in affected area in coordination with Section/Site In-charge.
  - Fire/Security service departments responding to affected area to contain and control the situation;
  - All other personnel not involved in mitigation operation shall be directed to assembly point; and
  - Contractor/ sub-contractor management shall ensure that their workmen are away from emergency site, not gathering around location of emergency.

- Toxic leakage from nearby live units can also lead to emergency situation at construction site. Guidelines for actions to be taken are as:
  - Inform immediate authority and also inform security and safety departments;
  - Evacuate all the personnel from the area immediately depending upon the wind direction to safest assembly point;
  - Call for help from fire and medical by phone/Cell/radio;
  - Arrange transport for any victims to medical Centre; and
  - Do not panic, act swiftly, do not run and proceed as per advice of emergency services.

- Bomb threat, sabotage, riot etc., also may lead to emergency situation at construction site. Such situation shall be dealt by HR/Admin and security department with the advice of Site In-charge.
  - Notification to the owner and authorizes to follow immediately.

- Natural calamities like earthquake, cyclone, and flood like situation can also lead to emergency situation at construction site. Site In-charge will act with required diligent and directive received from Concerned State Government, Corporate office and Owner.

- High Angle rescue -
    - First arrival. The first arriving HSE Officer should assume command after arriving on the scene;
    - HSE Officer should secure a witness as soon as possible after arriving on scene. This will help in identifying the problem and locating the victim;
    - Locate the victim to determine nature of injuries if any and report to Medical for response as needed.
    - Administer first aid to the victim as necessary;
    - Rescue team to use proper rescue kit / equipment to reach the victim;
    - Personnel man basket or aerial lift may be used to reach the victim if applicable;
    - Assess the hazards. HSE Officer to identify all potential hazards and assist rescuers.
    - The HSE Officer will be responsible for securing those hazards or making all members aware of those hazards.
    - HSE Officer shall be made aware of the specific emergency action plans once the emergency response team arrives.
    - The HSE Officer shall also be responsible for assuring that all safety procedures are adhered to.

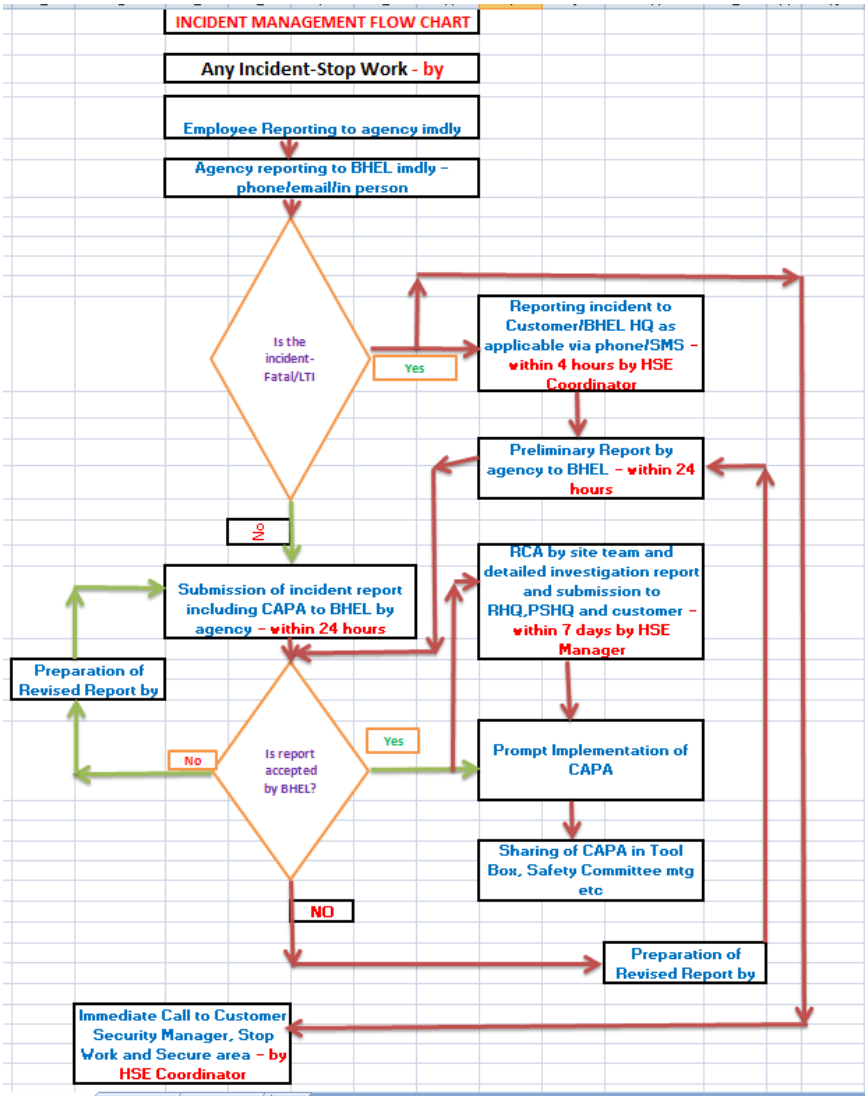
32.3 Communication system

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

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

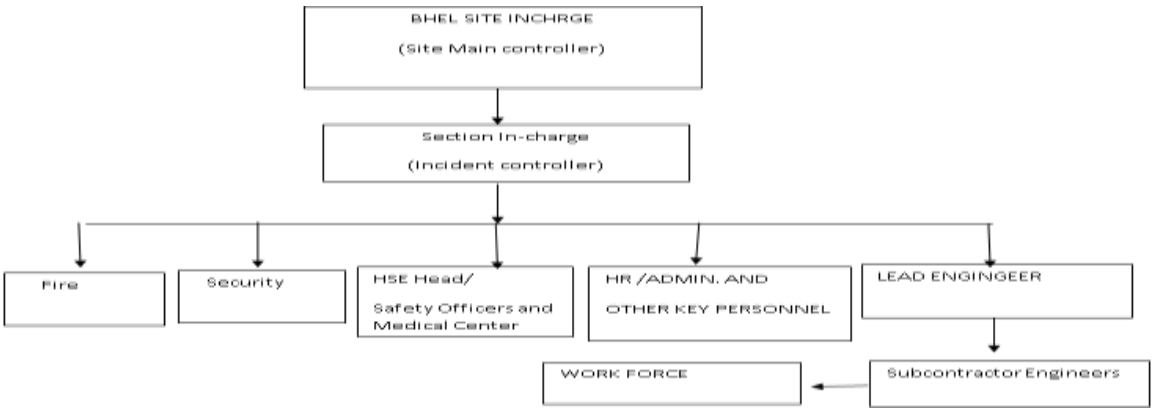
- BHEL Site/Section In-charge
    - BHEL Section In-charge will confirm the information with emergency services and also inform the Regional Manager as well as sub-contractors Site In-charge.

32.4 Communication matrix shall be as:



32.5 Emergency Organization -

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



34.6 List of Key Personnel -

Sl. No.	Name	Designation	Telephone Number	Mobile number

32.7 Emergency Control Center -

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

32.8 Emergency Drills -

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

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

32.9 Roles & Responsibility -

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

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

Responsibility of Section In-charge (Area Controller):

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

Fire officer /shift Fire in charge:

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

Security officer / In charge:

- Instruct and deploy security personnel at security posts/gates and around the affected area.
- Communicate with the auxiliary fire squad at emergency site immediately on receiving emergency call to ensure their mobilization.

- Cordon off the affected area and guide traffic /emergency vehicles and manage crowd control by dispersing unnecessary persons from the area.
- Ensure vigilance at security posts /gates and be in contact with area manager and other members connected with firefighting or rescue operation.
- Mobilize for evacuation of personnel to safe locations/assemble point.

Medical Center:

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

HR/Admin and HSE Teams:

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

34.10 General Requirements:

- Emergency preparedness and response capability of site shall be developed as per Emergency Preparedness and Response plan issued by Regional HQ
- Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its sub-contractors
- Assembly point shall be earmarked and access to the same from different location shall be shown in consultation with the owner
- Fire exit shall be identified and pathway shall be clear for emergency escape.
- Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection
- Adequate number of first aid boxes shall be strategically placed at different work places to cater emergency need. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same.
- First aid center shall be developed at site with trained medical personnel and ambulance
- Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations.
- Tie up with fire brigade shall be done in case customer is not having fire station.
- Tie up with hospital shall be done in case customer is not having hospital.
- Emergency Organization group shall be formed at site.
- Mock drill shall be conducted on different emergencies periodically (every three months) to find out gaps in emergency preparedness and taking necessary corrective action
-

33.0 WEATHER SEVERITY PLAN

A. OBJECTIVE AND SCOPE:

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

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

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

B. RESPONSIBILITIES

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

C. CYCLONE

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

The actions required during cyclone/Rough Weather:

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

D. **PERSONNEL EVACUATION**:

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

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

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

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

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

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

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

E. MONSOON:

During monsoon following precautions needs to be considered.

- **Excavation:** Inspect all excavations and protect from collapsing or subsidence. Clear all excavated material.
- **Storm water drains:** Check all storm water drains ahead of monsoon for any blockage etc. Identify way for draining out water collected in the site. If required, temporary drains should be prepared for draining out accumulated water in site. The sufficient number of dewatering pumps should be available for the purpose and logged water shall be pumped to nearest drain by dewatering pumps.
- **Access Routes:** Identify access routes to the site in case of flood. Sand should be available to spread over slippery surface.
- **Electrical Supply:** Beforehand check earthing of electrical panels and electrical cables for joints, cracks, insulation failure etc. Keep additional stock of electrical cables and plug tops for replacement of damaged one or to energize dewatering pumps. Do not keep electrical cables/welding cables on the ground but route them above head level. Do not use welding / DB sheds as shelters. All electrical equipment shall be equipped with ELCBs/RCCBs.
- **Power Cable route demarking:** cable rout shall be demarked by either by temporary or permanent.
- **Scaffolding:** Check all scaffolds for stability after heavy rain/storm.
- **Work restrictions:** Do not perform any height work, electrical work and rigging activities during rain. Lower the crane boom to avoid striking of lightning.
- **Vehicular movement:** Instruct the vehicle operators about following safety precautions during monsoon in daily tool box meeting, Slippery surface and road conditions, Speed limit, Wind shield wiper, Fog light, break condition is proper, break light is in proper condition & functioning. Not to take vehicle in loose soil.
    - **Lightening protection:** Boiler structure shall be facilitated with thunder protecting equipment.
    - **Workmen shed construction:** workmen rest shed shall be constructed in robust way. RCC pillar shall be used instead of brick pillar. It shall be facilitated with lightning arrestor as per site resource. However, if the rest room is nearby high mast light. Lighting arrestor may or may not be provided.
    - **Field Training Programme on Lightening/Thunder: Dos or Dos not.**

F. SAFETY PRECAUTIONS FOR SNAKE MENACE:

Preventive Measures –

- ③ Remove vegetation around the site
- ③ Pour Carbolic acid around site boundaries in regular intervals to keep away poisonous snakes.

Precautions to avoid snake bite –

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

Symptoms of Snake Bite –

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

Actions required in case of snake bite –

- ③ Reassure the victim
- ③ Immobilize the bitten body part without compression.
- ③ Get the patient to hospital as fast as safely possible
- ③ Tell the doctor any of the symptoms appearing on the way to the hospital.

Snakebite Emergency: DO's and DON'Ts

Do's:

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

③ Ensure the availability of anti-venom serum in the hospital.

Don'ts:

③ Do not bleed the wound, cut or increase bite marks or put ice on the bite

③ Do not eat or drink anything and engage in strenuous physical activity

③ Do not apply oral suction to bite

③ Do not take alcoholic beverage or any self-medication

③ Do not apply cold / hot packs or burn wound

③ Do not delay seeking medical attention

③ Do not remove dressings/elastic wrap until at hospital

G. EMERGENCY CONTACT LIST:

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

Emergency Contact Numbers

(Contact numbers to be filled by Site Management)

Client		
	Project Manager	
	Plant Safety Manager	
	CUSTOMER Fire Services	
	Medical and Ambulance Services	
	ADMIN-CUSTOMER	
	Security- CUSTOMER	
BHEL		
	RCM	
	Safety Manager	
	HSE COORDINATOR	
	HR-ADMIN	
SUB-VENDOR		
	RCM	
	Project Manager	
	Safety Manager	

	Ambulance	
	HR-ADMIN	
Emergency Services		
	Near Hospital	
	Near Fire Station	
	Ambulance Service	
	Police Station	

34.0 RECORDS

At the minimum, the contractor shall maintain/ submit HSE records in the following reporting formats:

- Safety Walk Through Report HSE-1
- Accident/ Incident Report HSE-2
- Supplementary Accident/ Incident Investigation report HSE-3
- Near Miss Incident Report HSE-4
- Monthly HSE Report HSE-5
- Permit for working at height HSE-5
- Permit for working in confined space HSE-7
- Permit for radiation work HSE-8
- Permit for demolishing/ dismantling HSE-9
- Safety checklist HSE-10
- Housekeeping Assessment & compliance HSE-11
- Inspection of temporary electrical booth/installation HSE-12
- Inspection for scaffolding HSE-13
- for erection/modification &dismantling of scaffolding HSE-14
- Permit for heavy lift/critical erection. HSE-15
- Permit for Energy isolation and de-isolation. HSE-16
- Permit for Excavation HSE-17
- Inspection reports of Equipment/tools/tackles *
- Report of Toolbox talks As indicated in specification
- PPE issue report/register *
- Site inspection reports *
- Training records *

(*) The formats shall be developed in consultation with EIL/Owner.

APPENDIX

THESE ARE PROVIDED BY CUSTOMER. IN ADDITION, SOME MORE FORMATS/DOCUMENTS WILL BE AVAILBLE AT BHEL-SITE HSE TEAM FOR USE.

APPENDIX-A
(Sheet 1 of 2)

A. IS CODES ON HSE

SP: 53 Safety code for the use, Care and protection of hand operated tools.
IS: 838 Code of practice for safety & health requirements in electric and gas welding and cutting operations

IS: 1179 Eye & Face precautions during welding, equipment etc.
IS: 1860 Safety requirements for use, care and protection of abrasive grinding wheels.
IS: 1989 (Pt -II) Leather safety boots and shoes
IS: 2925 Industrial Safety Helmets
IS: 3016 Code of practice for fire safety precautions in welding & cutting operation.
IS: 3043 Code of practice for earthing
IS: 3764 Code of safety for excavation work
IS: 3786 Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents
IS: 3696 Safety Code of scaffolds and ladders
IS: 4083 Recommendations on stacking and storage of construction materials and components at site
IS: 4770 Rubber gloves for electrical purposes
IS: 5121 Safety code for piling and other deep foundations
IS: 5216 (Pt-I) Recommendations on Safety procedures and practices in electrical works
IS: 5557 Industrial and Safety rubber lined boots
IS: 5983 Eye protectors
IS: 6519 Selection, care and repair of Safety footwear
IS: 6994 (Pt-I) Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 7293 Safety Code for working with construction Machinery
IS: 8519 Guide for selection of industrial safety equipment for body protection
IS: 9167 Ear protectors
IS: 11006 Flash back arrestor (Flame arrestor)
IS: 11016 General and safety requirements for machine tools and their operation
IS: 11057 Specification for Industrial safety nets
IS: 11226 Leather safety footwear having direct moulded rubber sole
IS: 11972 Code of practice for safety precaution to be taken when entering a sewerage system
IS: 13367 Code of practice-safe use of cranes
IS: 13416 Recommendations for preventive measures against hazards at working place

APPENDIX-A
(Sheet 2 of 2)

B. INTERNATIONAL STANDARDS ON HSE
Safety Glasses : ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092,

BS 1542, BS 679, DIN 4646/ 58311
Safety Shoes : ANSI Z 41.1, AS 2210, EN 345
Hand Gloves : BS 1651
Ear Muffs : BS 6344, ANSI S 31.9
Hard Hat : ANSI Z 89.1/89.2, AS 1808, BS 5240, DIN 4840
Goggles : ANSI Z 87.1
Face Shield : ANSI Z 89.1
Breathing Apparatus : BS 4667, NIOSH
Welding & Cutting : ANSI Z49.1
Safe handling of compressed:P-1 (Compressed Gas Association Gases in cylinders 1235 Jefferson Davis Highway,
Arlington VA 22202 - USA)
Full body harness : EN-361
Lanyard : EN-354
Karabiner : EN-362 and EN-12275

APPENDIX-B

DETAILS OF FIRST AID BOX

SL. NO.	DESCRIPTION	QUANTITY
1.	Small size Roller Bandages, 1 Inch Wide (Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 Inches Wide (Hand & Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 Inches Wide (Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing (Burn Dressing Large)	4 Pkts.
5.	Cotton Wool (20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savlon	1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water	1 Bottle
8.	Ammonia Solution (20 ml.)	1 Bottle
9.	A Pair of Scissors	1 Piece
10.	Adhesive Plaster (1.25 cm X 5 m)	1 Spool
11.	Eye pads in Separate Sealed Pkt.	4 pcs.
12.	Tourniqut	1 No.
13.	Safety Pins	1 Dozen
14.	Tinc. Iodine/ Betadin (100 ml.)	1 Bottle
15.	Polythene Wash cup for washing eyes	1 No.
16.	Potassium Permanganate (20 gms.)	1 Pkt.
17.	Tinc. Benzoine (100 ml.)	1 Bottle
18.	Triangular Bandages	2 Nos.
19.	Band Aid Dressing	5 Pcs.
20.	Iodex/Moov (25 gms.)	1 Bottle
21.	Tongue Depressor	1 No.
22.	Boric Acid Powder (20 gms.)	2 Pkt.
23.	Sodium Bicarbonate (20 gms.)	1 Pkt.
24.	Dressing Powder (Nebasulf) (10 gms.)	1 Bottle
25.	Medicinal Glass	1 No.
26.	Duster	1 No.
27.	Booklet (English& Local Language)	1 No. each
28.	Soap	1 No.
29.	Toothache Solution	1 No.
30.	Vicks (22 gms.)	1 Bottle
31.	Forceps	1 No.
32.	Note Book	1 No.
33.	Splints	4 Nos.
34.	Lock	1 Piece
35.	Life Saving/Emergency/Over-the counter Drugs	As decided at site

Box size: 14" x 12" x 4"

Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used.
A prescription, in this regard, shall be required from a qualified Physician.

APPENDIX-C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire					

APPENDIX-D

List of Statutory Acts & Rules Relating to HSE

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of service) Act
- Other Statutory Acts like EPF, ESIS, Minimum Wage Act.

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION Pit Excavation upto 3.0m	Falling into pit	Personal injury	Provide guard rails/ barricade with warning signal. Provide at least two entries/ exits. Provide escape ladders.
	Earth Collapse	Suffocation/ Breathlessness Buried	Provide suitable size of shoring and strutting, if required. Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more. Don't allow vehicles to operate too close to excavated areas. Maintain atleast 2m distance from edge of cut. Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock. Battering/benching the sides.
	Contact with buried electric cables Gas/ Oil Pipelines	Electrocution Explosion	Obtain permission from competent authorities, prior to excavation, if required. Locate the position of buried utilities by referring to plant drawings. Start digging manually to locate the exact position of buried utilities and thereafter use mechanical means.
Pit Excavation beyond 3.0m	Same as above Plus Flooding due to excessive rain/ underground water	Can cause drowning situation	Prevent ingress of water. Provide ring buoys. Identify and provide suitable size dewatering pump or well point system.
	Digging in the vicinity of existing Building/ Structure	Building/Structure may collapse Loss of health & wealth	Obtain prior approval of excavation method from local authorities. Use under-pining method. Construct retaining wall side by side.
	Movement of vehicles/ equipment's close to the edge of cut.	May cause cave-in or slides. Persons may get buried.	Barricade the excavated area with proper lighting arrangements. Maintain at least 2m distance from edge of cut and use stop blocks to prevent over-run. Strengthen shoring and strutting.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
Narrow deep excavations for pipelines, etc.	Same as above Plus Frequent cave-in or slides	May cause severe injuries or prove fatal	Battering/ benching of sides. Provide escape ladders.
	Flooding due to Hydro- static testing	May arise drowning situation	Same as above plus Bail out accumulated water. Maintain adequate ventilation.
Rock by excavation blasting	Improper handling of explosives	May prove fatal	Ensure proper storage, handling & carrying of explosives by trained personnel. Comply with the applicable explosive acts & rules.
	Uncontrolled explosion	May cause severe injuries or prove fatal	Allow only authorized persons to perform blasting operations. Smoking and open flames are to be strictly prohibited.
	Scattering of stone pieces in atmosphere	Can hurt people	Use PPE like goggles, face mask, helmets etc.
Rock excavation by blasting (Contd.)	Entrapping of persons/ animals.	May cause severe injuries or prove fatal	Barricade the area with red flags and blow siren before blasting.
	Misfire	May explode suddenly	Do not return to site for atleast 20 minutes or unless announced safe by designated person.
Piling Work	Failure of piledriving equipment	Can hurt people	Inspect Piling rigs and pulley blocks before the beginning of each shift.
	Noise pollution	Can cause deafness and psychological imbalance.	Use personal protective equipments like ear plugs, muffs, etc.
	Extruding rods/casing	Can hurt people	Barricade the area and install sign boards. Provide first-aid.
	Working in the vicinity of 'Live-Electricity'	Can cause electrocution/ Asphyxiation	Keep sufficient distance from Live-Electricity as per IS code. Shut off the supply, if possible. Provide artificial/rescue breathing to the injured.
(B) CONCRETING	Air pollution by cement	May affect Respiratory system	Wear respirators or cover mouth and nose with wet cloth.
	Handling of ingredients	Hands may get injured	Use gloves & other PPE.
	Protruding reinforcement rods.	Feet may get injured	Provide platform above reinforcement for movement of workers or provide end caps for protection on reinforcement bars.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Earthing of electrical mixers, vibrators, etc. not done.	Can cause electrocution/ asphyxiation	Ensure earthing of equipments and proper functioning of electrical circuit before commencement of work.
	Falling of materials from height	Persons may get injured	Use hard hats. Remove surplus material immediately from work place. Ensure lighting arrangements during night hours.
	Continuous pouring by same gang	Cause tiredness of workers and may lead to accident.	Insist on shift pattern. Provide adequate rest to workers between subsequent pours.
	Revolving of concrete mixer/ vibrators	Parts of body or clothes may get entrapped.	Allow only mixers with hopper. Provide safety cages around moving motors. Ensure proper mechanical locking of vibrator.
Super-structure	Same as above plus Deflection in props or shuttering material	Shuttering/props may collapse and prove fatal	Avoid excessive stacking on shuttering material. Check the design and strength of shuttering material before commencement of work. Rectify immediately the deflection noted during concreting.
	Passage to work place	Improperly tied and designed props/planks may collapse	Ensure the stability and strength of passage before commencement of work. Do not overload and stand under the passage.
(C) REINFORCE MENT	Curtailment and binding of rods	Persons may get injured	Use PPE like gloves, shoes, helmets, etc. Avoid usage of shift tools.
	Carrying of rods for short distances/at heights	Workers may get injured their hands and shoulders.	Provide suitable pads on shoulders and use safety gloves. Tie up rods in easily liftable bundles. Ensure proper staging.
	Checking of clear distance/ cover with hands	Rods may cut or injure the fingers	Use measuring devices like tape, measuring rods, etc.
	Hitting projected rods and standing on cantilever rods.	Persons may get injured and fell down	Use safety shoes and avoid standing unnecessarily on cantilever rods. Avoid wearing of loose clothes.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Falling of material from height	May prove fatal	Use helmets. Provide safety nets.
	Transportation of rods by trucks/ trailers	Protruded rods may hit the persons	Use red flags/lights at the ends. Do not protrude the rods in front of or by the side of driver's cabin. Do not extend the rods 1/3rd of deck length or 1.5m whichever is less.
(D) WELDING AND GAS CUTTING	Welding radiates invisible ultraviolet and infra-red rays	Radiation can damage eyes and skin.	Use specified shielding devices and other PPE of correct specifications. Avoid thoriated tungsten electrodes for GTAW.
	Improper placement of oxygen and acetylene cylinders	Explosion may occur	Move out any leaking cylinder. Keep cylinders in vertical position. Use trolley for transportation of cylinders and chain them. Use flashback arrestors
	Leakage/ cuts in hoses	May cause fire	Purge regulators immediately and then turn off. Never use grease or oil on oxygen line connections and copper fittings on acetylene lines. Inspect regularly gas carrying hoses. Always use red hose for acetylene & other fuel gases and black for oxygen.
	Opening-up of cylinder	Cylinder may burst	Always stand back from the regulator while opening the cylinder. Turn valve slowly to avoid bursting. Cover the lug terminals to prevent short circuiting.
	Welding of tanks, container or pipes storing flammable liquids	Explosion may occur	Empty & purge them before welding. Never attach the ground cable to tanks, container or pipe storing flammable liquids. Never use LPG for gas cutting.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(E) RADIOGRAPHY	Ionizing radiation	Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc.	Ensure Safety regulations as per BARC/AERB before commencement of job. Cordon off the area and install Radiation warning symbols. Restrict the entry of unauthorized persons. Wear appropriate PPE and film badges issued by BARC/AERB.
	Transportation and Storage of Radiography source	Same as above	Never touch or handle radiography source with hands. Store radiography source inside a pit in an exclusive isolated storage room with lock and key arrangement. The pit should be approved by BARC/AERB. Radiography source should never be carried either in passenger bus or in a passenger compartment of trains. BARC/AERB has to be informed before source movement. Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.
	Loss of Radio Isotope	Same as above	Try to locate with the help of Survey Meter. Inform BARC/AERB (*)
(F) ELECTRICAL INSTALLATION AND USAGE	Short circuiting	Can cause Electrocution or Fire	Use rubberized hand gloves and other PPE. Don't lay wires under carpets, mats or door ways. Allow only licensed electricians to perform on electrical facilities. Use one socket for one appliance. Ensure usage of only fully insulated wires or cables. Don't place bare wire ends in a socket. Ensure earthing of machineries and equipments Do not use damaged cords and avoid temporary connections. Use spark-proof/ flame proof type field distribution boxes.

(*) Atomic Energy Regulatory Board (AERB),
Bhabha Atomic Research Centre (BARC)
Anushaktinagar, Mumbai – 400 094

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Do not allow open/bare connections. Provide all connections through 30mA ELCB. Protect electrical cables/equipments from water and naked flames. Check all connections before energizing.
	Overloading of Electrical System	Bursting of system can occur which leads to fire	Display voltage and current ratings prominently with 'Danger' signs. Ensure approved cable size, voltage grade and type. Switch off the electrical utilities when not in use. Do not allow unauthorized connections. Ensure proper grid wise distribution of Power.
	Improper laying of overhead and underground transmission lines/cables	Can cause electrocution and prove fatal	Do not lay unarmoured cable directly on ground, wall, roof of trees. Maintain at least 3m distance from HT cables. All temporary cables should be laid at least 750 mm below ground on 100 mm fine sand overlying by brick soling. Provide proper sleeves at crossings/ intersections. Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions/ termination.
(G) FIRE PREVENTION AND PROTECTION	Small fires can become big ones and may spread to the surrounding areas	Cause burn injuries and may prove fatal	In case a fire breaks out, press fire alarm system and shout "Fire, Fire". Keep buckets full of sand & water/ fire extinguishing equipment near hazardous locations Confine smoking to 'Smoking Zones' only. Train people for using specific type of fire fighting equipments under different classes of fire. Keep fire doors/ shutters, passages and exit doors unobstructed. Maintain good housekeeping and first-aid boxes (for details refer Appendix-B). Don't obstruct assess to Fire extinguishers. Do not use elevators for evacuation during fire. Maintain lightening arrestors for elevated structures. Stop all electrical motors with internal combustion.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Move the vehicles from dangerous locations. Remove the load hanging from the crane booms. Remain out of the danger areas.
	Improper selection of Fire extinguisher	It may not extinguish the fire	Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Appendix-C). Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/ CO2/ sand or earth.
	Improper storage of highly inflammable substances	Same as above	Maintain safe distance of flammable substances from source of ignition. Restrict the distribution of flammable materials to only min. necessary amount. Construct specifically designed fuel storage facilities. Keep chemicals in cool and dry place away from heat. Ensure adequate ventilation. Before welding operation, remove or shield the flammable material properly. Store flammable materials in stable racks, correctly labeled preferably with catchment trays. Wipe off the spills immediately.
	Short circuiting of electrical system	Same as above Can cause Electrocution	Don't lay wires under carpets, mats or door ways. Use one socket for one appliance. Use only fully insulated wires or cables. Do not allow open/bare connections. Provide all connections through 30mA ELCB. Ensure earthing of machineries and equipments
(H) VEHICULAR MOVEMENT	Crossing the Speed Limits (Rash driving)	Personal injury	Obey speed limits and traffic rules strictly. Always expect the unexpected and be a defensive driver. Use seat belts/ helmets. Blow horn at intersections and during overtaking operations. Maintain the vehicle in good condition. Do not overtake on curves, bridges and slopes.
	Adverse weather condition	Same as Above	Read the road ahead and ride to the left. Keep the wind screen and lights clean. Do not turn at speed. Recognize the hazard, understand the defense and act correctly in time.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Consuming alcohol before and during the driving operation	Same as above	Alcohol and driving do not mix well. Either choose alcohol or driving. If you have a choice between hitting a fixed object or an on-coming vehicle, hit the fixed object. Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive. Do not force the driver to drive fast and round the clock. Do not day dream while driving.
	Falling objects/ Mechanical failure	May prove fatal	Ensure effective braking system, adequate visibility for the drives, reverse warning alarm. Proper maintenance of the vehicle as per manufacturer instructions.
(I) PROOF TESTING (HYDROSTATIC/ PNEUMATIC TESTING)	Bursting of piping Collapse of tanks Tanks flying off	May cause injury and prove fatal	Prepare test procedure & obtain EIL/ Owner's approval. Provide separate gauge for pressurizing pump and piping/equipment. Check the calibration status of all pressure gauges, dead weight testers and temperature recorders. Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range. Provide safety relief valve (set at pressure slightly higher than test pressure) while testing with air/ nitrogen. Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/nuts, grouting, etc. before and during testing. Keep the vents open before opening any valve while draining out of water used for hydro-testing of tanks. Pneumatic testing involves the hazard of released energy stored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of the test pressure. The gas used as test fluid, if not air, shall be nonflammable and nontoxic.
(J) WORKING AT HEIGHTS	Person can fall down	May sustain severe injuries or prove fatal	Provide guard rails/barricade at the work place. Use PPE like full body harness, life line, helmets, safety shoes, etc. Obtain a permit before starting the work at height above 3 meters. Fall arrest and safety nets, etc. must be installed. Provide adequate working space (min. 0.6 m). Tie/weld working platform with fixed support. Use roof top walk ladder while working on a slopping roofs. Avoid movement on beams.
		May hit the scrap/material stacked at the ground or in between	Keep the work place neat and clean. Remove the scrap immediately.
	Material can fall down	May hit the workers working at lower levels and prove fatal	Same as above plus Do not throw or drop materials or equipment from height i.e. do not *bomb* materials. All tools to be carried in a tool-kit Bag or on working uniform. Remove scrap from the planks. Ensure wearing of helmet by the workers working at lower levels.
(K) CONFINED SPACES	Suffocation/ drowning	Unconsciousness, death	Use respiratory devices, if reqd. Avoid over crowding inside a confined space. Provide Exhaust fans for ventilation Do not wear loose clothes, neck ties, etc. Fulfill conditions of the permit.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Check for presence of hydrocarbons, O2 level. Obtain work permit before entering a confined space. Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange.
	Presence of foul smell and toxic substances	Inhalation can pose threat to life	Same as above plus Check for hydrocarbon and Aromatic compounds before entering a confined space. Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency.
	Ignition/ flame can cause fire	Person may sustain burn injuries or explosion may occur	Keep fire extinguishers at a hand distance. Remove surplus material and scrap immediately. Do not smoke inside a confined space. Do not allow gas cylinders inside a confined space. Use low voltage (24V) lamps for lighting. Use tools with air motors or electric tools with max. voltage of 24V. Remove all equipments at the end of the day.
(L) HANDLING AND LIFTING EQUIPMENTS	Failure of load lifting and moving equipment's	Can cause accident and prove fatal	Avoid standing under the lifted load and within the operating radius of cranes. Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery. Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc. Allow crane to move only on hard, firm and leveled ground. Allow lifting slings as short as possible and check gunny packings at the friction points. Do not allow crane to tilt its boom while moving. Install Safe Load Indicator. Ensure certification by applicable authority.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	Overloading of lifting equipments	Same as above	Safe lifting capacity of derricks and winches written on them shall be got verified The max. safe working load shall be marked on all lifting equipment's Check the weight of columns and other heavy items painted on them and accordingly decide about the crane capacity, boom and angle of erection Allow only trained operators and riggers during crane operation.
	Overhead electrical wires	Can cause electrocution and fire	Do not allow boom or other parts of crane to come within 3m reach of overhead HT cables. Hook and load being lifted shall preferably remain in full visibility of crane operators.
(M) SCAFFOLDING FORMWORK AND LADDERS	Person can fall down	Person May sustain severe injuries and prove fatal	Provide guard rails for working at height. Face ladder while climbing and use both hands. Ladders shall extend about 1m above landing for easy access and tying up purpose. Do not place ladders against movable objects and maintain base at 1/4 unit of the working length of the ladder. Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes. No loose planks shall be allowed. Use PPE, like helmets, safety shoes, etc.
	Failure of scaffolding material	Same as above	Inspect visually all scaffolding materials for stability and anchoring with permanent structures. Design scaffolding for max. load carrying capacity. Scaffolding planks shall not be less than 50x250 mm full thickness lumber or equivalent. These shall be cleated or secured and must extend over the end supports by at least 150mm and not more than 300mm. Don't overload the scaffolds. Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.
	Material can fall down	Persons working at lower level gets injured	Remove excess material and scrap immediately. Carry the tools in a tool-kit bag only. Provide safety nets.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (…Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(N) STRUCTURAL WORKS	Personal negligence and danger of fall	Can cause injury or casualty	Do not take rest inside rooms built for welding machines or electrical distribution system. Avoid walking on beams at height. Wear helmet with chin strap and full body harness while working at height. Use hand gloves and goggles during grinding operations. Cover or mark the sharp and projected edges. Do not stand within the operating radius of cranes.
	Lifting/ slipping of material	Same as above	Do not stand under the lifted load. Stack properly all the materials. Avoid slippage during handling. Control longer pieces lifted up by cranes from both ends. Remove loose materials from height. Ensure tightening of all nuts & bolts.
(O) PIPELINE WORKS	Erection/ lowering failure	Can cause injury	Do not stand under the lifted load. Do not allow any person to come within the radii of the side boom handling pipes. Check the load carrying capacity of the lifting tools & tackles. Use Safe Load Indicators (SLI) Use appropriate PPEs.
	Other	Same as above	Wear gum boots in marshy areas. Allow only one person to perform signaling operations while lowering of pipes. Provide night caps on pipes. Provide end covers on pipes for stoppage of pigs while testing/ cleaning operations.
(P) GRIT BLASTING	Pollution in neighboring area, hit by grits and high pressure air	Can cause personal injury	Ensure the blasting is done in enclosed shed. Keep safe distance while blasting operations. Wear positive pressure blast hood or helmet with view-window, ear-muff/plug, gloves, overall or leather coat /apron, rubber shoes.

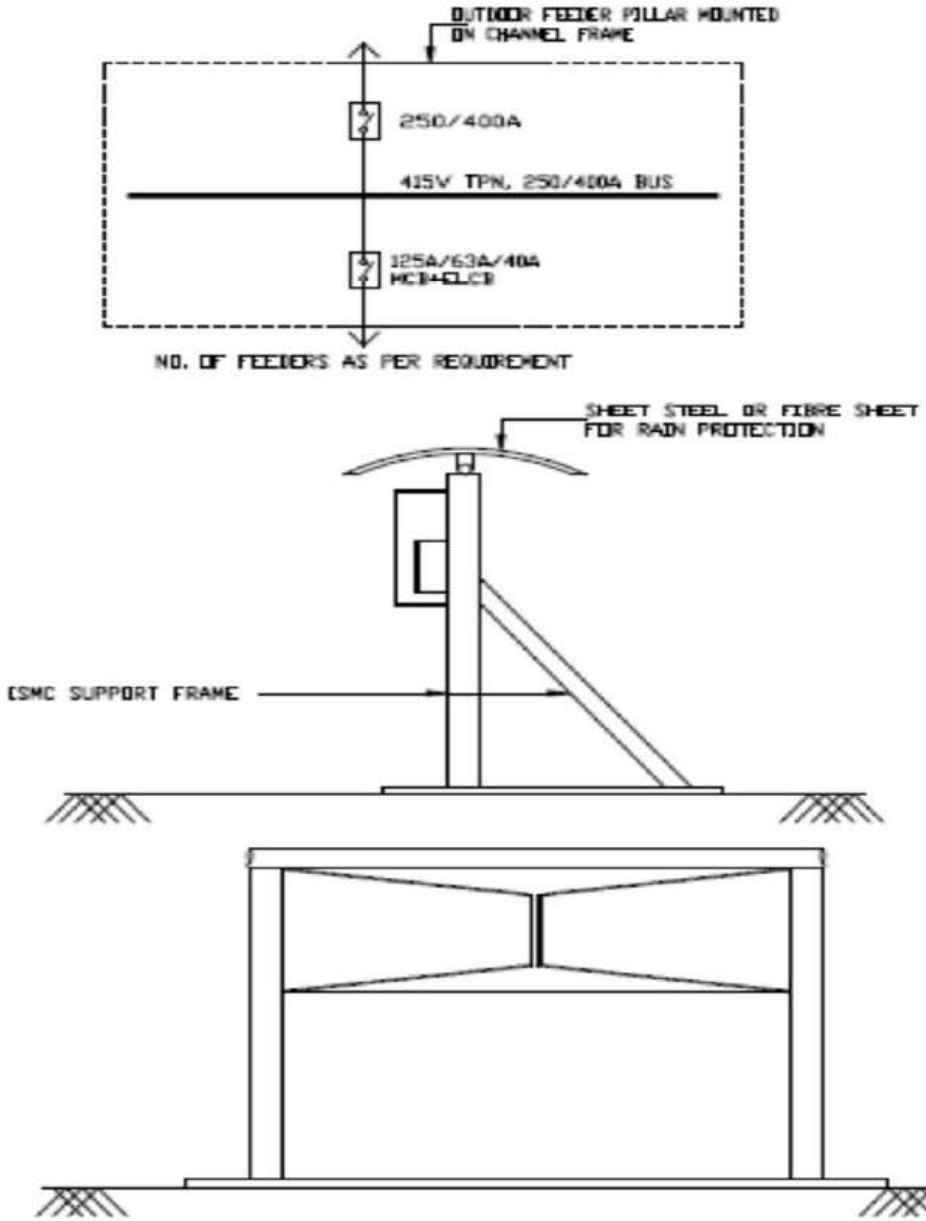
TRAINING SUBJECTS / TOPICS

(For contractors' personnel)

1. The Law & Safety – Statutory Requirement / Applicable statutes / Duties of employer / employee
2. Policy & Administration – Why HSE? / Duties & Responsibilities of Safety Personnel at project site / Effect of incentive on accident prevention
3. HSE & Supervision – Duties of Supervisor / HSE integrated supervision/ Who should be held responsible for site accidents?
4. Safety Budget / Cost of Accidents – Direct costs / Indirect costs
5. Hazard Identification / Type of hazards / HIRAC
6. Behavioural Safety & Motivation
7. Housekeeping – Storage / Stacking / Handling of materials / Hydra handling
8. Occupational Health in Construction sector
9. Personal Protective Equipments – Respiratory & Non- respiratory
10. Electricity & Safety – ELCB / Fuse / Powered tools / Project illumination
11. Handling of Compressed Gas – Transportation / Storage / FBAs / Fire prevention
12. Machine Safety – Machine guarding / Maintenance
13. Transportation – Hazards & risks in transp. of materials / ODC consignments
14. Cranes & Other Lifting machinery – Legal requirements vis-à-vis essential safety requirements.
15. Communication – HSE Induction/ TBTs/ Safety Committee/ Safety meeting/ Safety propaganda/ Publicity.
16. Excavation – Risks & Dangers / Safety measures
17. Working at Heights – Use of ladder / Work on roofs / Scaffolds / Double harness lanyards / Lifeline / Fall arrester / Safety Nets / Floor openings
18. Hazards in Welding & important safety precautions
19. Gas Cutting – Hazards & safety measures
20. Fire prevention & fire protection

APPENDIX - G

CONSTRUCTION POWER BOARD (typ.)



NOTES:-

1. CONTRACTOR TO INSTALL TEMPORARY CONST. POWER BOARD AS SHOWN IN THE DRG. ITS LOCATION SHALL BE EASILY ACCESABALE.
2. POWER DISTRIBUTION BOARD SHALL BE EARTHED AT TWO POINTS BY MINIMUM 40X5MM GI STRIP FROM THE AVILABLE GRID ORDIRECTLY CONNECTED TO TWO DIRECTLY DRIVEN EARTH ELECTRODES.
3. DISTRIBUTION BOARD SHALL BE FABRICATED BY USING 14MM CRCA SHEET STEELWITH HINGED DOORSAND ALL COMPONENT MOUNTED IN IT.
4. ALL INCOMING AND OUTGOING CABLESSHALL HAVE BOTTOM ENTRY.

APPENDIX-H

LIST OF PROCEDURES (MINIMUM) TO BE FORMING PART OF HSE PLAN:-

A. HSE Management Procedures:

- HSE Risk Management (including HIRA)
- HSE Legal Compliance and Other Requirements
- HSE Objectives & Performance
- HSE Training and Competence (including Induction)
- HSE Motivation &Award Scheme
- HSE Audits
- HSE Meetings
- HSE Sub Contractor Management
- HSE Emergency Management
- HSE Incidents Reporting and Management
- HSE Reports
- HSE Management System Review
- HSE Change Management
- HSE procedure for Behaviour based Safety
- First Aid & Management
- Roles, Responsibility, Accountabilities and Authorities

B. Job procedures/ Safe Operating procedures

- Setting Up Site & Signages
- Handling of Electrical Appliances
- Working at Height
- Confined Space Entry
- Permit to Work (including hot works)
- Housekeeping
- Lifting Operations
- Transportation of Materials including Manual Handling
- Compressed Air Tools and Units
- Earthmoving Operations & excavation
- Scaffolding
- Fire Prevention/ Protection
- Hazardous Substance Handling & Storage
- Radiation Hazard
- Personal Protective Equipment

FORMAT NO. : HSE-1 REV 0

(Sheet 1 of 6)

SAFETY WALK-THROUGH REPORT

(Name & signature of walk through performer to be inserted at the bottom of each page)

Project : _____ Report no. : _____

Date : _____ Contractor : _____

Inspection by : _____ Owner : _____

Frequency : Monthly Job no. : _____

Note : Write 'NA' wherever the item is not applicable

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
1.	HOUSEKEEPING				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and Clean				
c)	Passageways and Walkways Clear				
d)	General neatness of working areas				
e)	Other				
2.	PERSONNEL PROTECTIVE EQUIPMENT				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Foot protection				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Full body harness conforming to C€, EN 361				
h)	Hard hat (HDPE)				
i)	Other				
3.	EXCAVATIONS/ OPENINGS				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Other				

Safety walk-through performer (Name & Signature) .....

FORMAT NO. : HSE-1 REV 0

(Sheet 2 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
4.	WELDING & GAS CUTTING				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Live electrode bits contained properly				
f)	Fire extinguisher (s) accessible				
g)	Other				
5.	SCAFFOLDING & BARRICADING				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Positive barricading for critical activities				
g)	Installation of warning signs				
h)	Other				
6.	LADDERS				
a)	Extension side rails 1 m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70^0 from horizontal				
e)	Other				

Safety walk-through performer (Name & Signature) .....

FORMAT NO. : HSE-1 REV 0

(Sheet 3 of 6)

SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
7.	HOISTS, CRANES AND DERRICKS				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes O.K.				
c)	Inspection and maintenance log-books maintained				
d)	Outriggers used				
e)	Reverse horn installed / active / coupled with gear				
f)	Signs/barricades provided				
g)	Signals observed and understood				
h)	Qualified operators				
i)	Other				
8.	MACHINERY, TOOLS AND EQUIPMENT				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Other				
9.	VEHICLE AND TRAFFIC				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Other				

Safety walk-through performer (Name & Signature) .....

FORMAT NO. : HSE-1 REV 0

(Sheet 4 of 6)

SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
10.	TEMPORARY FACILITIES				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Other				
11.	FIRE PREVENTION				
a)	Personnel trained & instructed to make use of facility				
b)	Fire extinguishers checked periodically & record maintained				
c)	No smoking in Prohibited areas.				
d)	Fire Hydrants not obstructed				
e)	Regular fire drill conducted				
12.	ELECTRICAL				
a)	Use of 3-core armored cables everywhere				
b)	Usage of 'All insulated' or 'double-insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (Main DB)				
e)	Continuity and tightness of earth conductor				
f)	Effective covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards maintained				
f)	DCP extinguishers arranged & licensed electrician engaged at site				

Safety walk-through performer (Name & Signature) .....

FORMAT NO. : HSE-1 REV 0

(Sheet 5 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
14.	HANDLING AND STORAGE OF MATERIALS				
a)	Safely stored or stacked				
b)	Passageways clear / free from obstructions				
c)	Fire fighting facility in place				
15.	FLAMMABLE GASES AND LIQUIDS				
a)	Containers clearly identified / protected from fire				
b)	Safe storage & transportation arrangement made				
c)	Fire extinguishers positioned nearby				
d)	Facilities kept away from electric spark, hot spatters & ignition source.				
16.	WORKING AT HEIGHT				
a)	Approved Erection plan and work permit in place				
b)	Safe access, Safe work platform & Safety nets provided				
c)	Life lines, Fall arrester, Full body harness with double lanyards used;				
d)	Health Check record available for workers going up?				
e)	Protective handrails arranged around floor openings				
17.	CONFINED SPACE				
a)	Work Permit obtained from requisite authority				
b)	Test for toxic gas and sufficient availability of oxygen conducted & status				
c)	Supervisor present at site & at least one person outside the confined space for monitoring deputed				
d)	Availability of safe means of entry, exit and ventilation (register for entry & exit maintained)				
e)	Fire extinguisher and first-aid facility ensured				
f)	Lighting provision made by using 24V Lamp				
g)	Proper usage of PPEs ensured				
18.	RADIOGRAPHY				
a)	Proper storage and handling of source as per BARC/ AERB guidelines (authorized radiographer available)				
b)	Work permit obtained				

Safety walk-through performer (Name & Signature).....

FORMAT NO. : HSE-1 REV 0

(Sheet 6 of 6)

SL. NO.	ITEM	Satisfactory / Yes	Non satisfactory /No	Remarks	Action
c)	Cordoning of the area done				
d)	Use of appropriate PPE's ensured				
e)	HSE training to workers/supervisors imparted during the fortnight (indicate topic)				
f)	Minimum occupancy of workplace ensured				
19.	HEALTH CHECKS				
a)	All Workers medically examined and found be fit for working at heights (slinging, rigging, painting etc.) in confined space in excavation / trenching in shot blasting				
b)	Availability of First Aid box with contents				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities.				
e)	Measures for dealing with illness at site & labour camps.				
f)	Availability of Potable drinking water for workmen & staff.				
g)	Provision of crèches for children.				
h)	Stand by vehicle / ambulance available for evacuation of injured				
20.	ENVIRONMENT				
a)	Chemical and Other Effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/ Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc. disposed properly				
f)	Disposal of surplus earth, stripping materials, Oily rags and combustible materials done properly				
g)	Green belt protection				

Safety walk-through performer (Name & Signature) .....

FORMAT NO. : HSE-2 REV 0

(Sheet 1 of 3)

ACCIDENT / INCIDENT REPORT

(To be submitted by Contractor after every Incident / Accident within 24 hours to EIL/ Owner)

Report No.: _____ **Date**: _____

Project site: _____ **Name of work:** _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTA)	Hospitalized but resumed duty before end of 48 hrs	
Disabling injury (other LTA)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTA):	Death / Expiry	
First Aid case (non LTA)	Resume duty after first aid	

Name of the injured: _____ Father's name of victim: _____

Sub Contractor's Name: .....

Gate Pass No.: ..... Age: _____Yrs. Victim's medical fitness exam. (Pre-empl.) date: _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1) _____ (2) _____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c. operator	
Engineer		Manager		Other/ specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

_____

FORMAT NO. : HSE-2 REV 0

(Sheet 2 of 3)

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident? .....

.....

.....

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

FORMAT NO. : HSE-2 REV 0

(Sheet 3 of 3)

Medical Aid provided:- (indicate specific aids / treatment etc.)

……

……..

Actions taken to prevent recurrence of similar incident / accident: ……

……

……

……

……

……

……..

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom ……..

Safety Officer
(Signature and Name)
Stamp of Contractor

Site Head / Resident Construction Manager
(Signature and Name)

To : Owner
: RCM/Site-in-charge EIL (3 copies)
→ Divisional Head (Constn.) through RCM
→ Project Manager, EIL, through RCM

FORMAT NO. : HSE-3 REV 0

(Sheet 1 of 5)

SUPPLEMENTARY INCIDENT / ACCIDENT INVESTIGATION REPORT
TICK THE APPROPRIATE ONE AS APPLICABLE (furnish within 72 hours)

Supplementary to Incident / Accident Report No: _____ (Copy enclosed)

Report No.: _____ **Date:** _____

Project site: _____ **Name of work:** _____

Contractor's name: _____ Contractor's Job Engineer (name) _____

Non-disabling injury (Non-LTA)	Hospitalized but resumed duty before end of 48 hrs	
Disabling injury (other LTA)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTA):	Death / Expiry	
First Aid case (non LTA)	Resume duty after first aid	

Name of the injured: _____ Father's name of victim: _____

Sub Contractor's Name: .....

Gate Pass No.:..... Age: _____Yrs. Victim's medical fitness exam. (Pre-empl.) date: _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1) _____ (2) _____ (3) _____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c. operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

_____

FORMAT NO. : HSE-3 REV 0

(Sheet 2 of 5)

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident? .....

.....

.....

Particular of tools & tackles being used and condition of the same after incident/accident:

.....

.....

Description of Incident/Accident (How the incident was caused):

.....

.....

.....

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

FORMAT NO. : HSE-3 REV 0

(Sheet 3 of 5)

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

Name & Designation of person who provided First-Aid to the victim: .....

Name & Telephone number of Hospital where the victim was treated _____

Mode of transport used for transporting victim – Ambulance / Private car / Tempo / Truck / Others

How much time taken to shift the injured person to Hospital _____

In case of FATAL incident, indicate clearly the BOCW Registration No. of the victim/ Company .....

Comments of Medical Practitioner, who treated / attended the victim/injured (attached / described here) _____

What actions are taken for investigation of the incident, please indicate clearly – (Video film / Photography / Measurements taken etc. .....)

Immediate cause (Please tick the right applicable) –

Hazardous methods or procedures inadequately guarded		Poor housekeeping		Inadequate or improper PPE	
Environmental hazards (excess noise/ space constraint/ inadequate ventilation)		improper illumination/ Moving on oval surface		Working on dangerous equipment	

FORMAT NO.: HSE-3 REV 0

(Sheet 4 of 5)

Failure to secure		Horse-play		Failure to use PPE	
Inattention to surroundings		Improper use of hands & body-parts		By-passing safety devices	
Unsafe mixing or placement of tools & tackles		Bypassing standard procedures		Failure in communication	
Operating without authority		Improper use of equipment or tools & tackles		drug or alcoholic influence	
excessive haste		Others(specify)			

Basic cause

Over confidence		Impulsiveness		over-exertion	
Faulty judgement or poor understanding		Failing to keep attention constantly		Nervousness & Fear	
Fatigue		Defective vision		Ill health or sickness	
Slow reaction		Others(specify)			

Root cause

Inadequate Engg		Improper Design		Inadequate Planning & organization	
Inadequate knowledge		Inadequate skill		Inadequate training	
Inadequate supervision		Improper work procedure		Inadequate compliance with standard	
Substandard performance		Inadequate maintenance		Improper inspection	
Others(specify)					

Loss of man days and impact on site works, (if any) –

_____

Remarks from Contractor's Safety Officer/ Engineer –

Was the victim performing relevant tasks for which he was engaged /employed? Yes / No

Was the Supervisor present on work-site during the incident? Yes / No

Have the causes of incident rightly identified? Yes / No

Cause of Accident was_____

FORMAT NO. : HSE-3 REV 0

(Sheet 5 of 5)

Remedial measures recommended by **Safety Officer of Contractor** for avoiding similar incident in future :

.....

.....

.....

.....

.....

.....

.....

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA.

If yes, to whom .....

.....

Safety Officer
(Signature and Name)

Site Head / Resident Construction Manager
(Signature and Name)
Stamp of Contractor

To : Owner
: RCM / Site-in-charge of EIL (3 copies)
→ Divisional Head (Constn.) through RCM
→ Project Manager EIL, through RCM

FORMAT NO. : HSE-4 REV 0

NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE SUGGESTED PROFORMA
(to be submitted within 24 hours)

- **Near Miss** : Human injury escaped & no damage to property, equipment or interruption to work.
- **Dangerous Occurrence**: Damage to property, equipment or interruption of work, but not resulting in personal injury/ illness, e.g. Fire incident, collapse of structure, crane failure, etc.

Report No.: _____

Name of Site: _____ Date: _____

Name of work: _____ Contractor: _____

Incident reported by :

Date & Time of Incident :

Location :

Brief description of incident

Probable cause of incident

Suggested corrective action

Steps taken to avoid recurrence Yes ☐ No ☐

To : Owner
: RCM/Site-in-charge EIL (3 copies)
→ Divisional Head (Constn.) through RCM
→ Project Manager EIL, through RCM

FORMAT NO. : HSE-5 REV 1

MONTHLY HEALTH, SAFETY & ENVIRONMENTAL (HSE) REPORT

(To be submitted by each Contractor)

Actual work start Date: _____ For the Month of: _____
Project: _____ Report No: _____
Name of the Contractor: _____ Status as on : _____
Name of Work : _____ Job No : _____
(Contractor in consultation with EIL shall generate the reports through web based package(www3.eil.co.in/eilhse)only.

ITEM		UPTO PREVIOUS MONTH	THIS MONTH	CUMULATIVE
1) Average number of Staff & Workmen (average daily headcount, not man days)				
2)Total Man-hours worked				
3) Number of Induction programmes conducted				
4) Number of HSE meetings organized at site				
5) Number of HSE awareness programmes conducted at site				
6) Number of Tool Box Talks conducted				
7) Number of Lost Time Accidents (LTA)	Fatal			
	Other LTA			
8) Number of Loss Time Injuries (LTI)	Fatalities			
	Other LTI			
9) Number of Non-Loss Time Accidents				
10) Number of First Aid Cases				
11) Number of Near Miss Incidents				
12) No. of unsafe acts/ practices detected				
13) No. of disciplinary actions taken against staff/ workmen				
14) Man-days lost due to accidents				
15) LTA Free man-hours i.e. LTA free man-hours counted from the Last LTA (enter date: .....)				
16) Frequency Rate (No. of LTA per 2 lacs man-hours worked)				
17) Severity Rate (No. of man days lost per 2 lacs man-hours worked)				
18) Loss Time Injury Frequency (No. of LTI per 2 lacs man-hours worked)				
19) No. of activities for which HIRAC completed				
20) No. of incentives/ awards given				
21) No. of occasions on which penalty imposed by EIL/ Owner				
22) No. of Audits conducted				
23) No. of pending NCs in above Audits				
24) Compensation cases raised with Insurance				
25) Compensation cases resolved and paid to workmen				
26) No of Vehicular Accident cases				
27) No of fire/Explosion cases				
28) Whether workmen compensation policy taken			Yes	No
29) Whether workmen compensation policy is valid			Yes	No
30) Whether workmen registered under ESI Act, as applicable			Yes	No
31) Whether HIRAC Register prepared and updated			Yes	No
32) Whether Environment Aspect Impact Register prepared and updated			Yes	No
33) Whether Legal Register prepared and updated			Yes	No
Remarks, if any				

Date:

Prepared by Safety Officer (Signature and Name)

Approved by Site Head / Resident Construction Manager (Signature and Name)

To : - OWNER
- RCM EIL (2 copies)

FORMAT NO. : HSE-6 REV 0

PERMIT FOR WORKING AT HEIGHTS (ABOVE 2.0 METER)

(In duplicate to be issued daily for site and for office)

Permit No..... Name of Main Contractor.....

Name of work executing agency / sub agency / vendor .....

Date..... Exact Location of work.....

Nature of work ..... Duration of work (from) ..... (to) .....

Number of workers covered within this permit .....

(*List enclosed with name & gate pass numbers.*)

Sl. No.	Items / Subjects	Status of compliance (Yes / No)	
1	Work areas / Equipments inspected		
2	Work area cordoned off		
3	Adequate lighting is provided		
4	Precautions against public traffic taken		
5	Concerned persons in & around have been alerted & cautioned		
6	Hazards / risks involved in routine / non-routine task assessed and control measures have been implemented at specific task		
7	ELCB provided for electrical connection & found working		
8	Ladder safely attached / fixed		
9	Scaffoldings are checked and TAGs are found used correctly		
10	Working platforms are provided and are found sound /safe for use		
11	Safe access & egress arrangements (e.g. ladders, fall arresters, life-lines etc.) are satisfactorily incorporated		
12	a. Openings on platform / floors are effectively cordoned / covered		
	b. Safety Nets are provided wherever required		
13	Use of following safety gadgets by people working at area under this permit, is checked and found satisfactory - Safety helmet Safety harness (full body) with double lanyard Safety Shoes Safety gloves Safety goggles		
14	Housekeeping of work area found satisfactorily tidy / clean & clear		
15	Adequate measures have been taken for works being continued at the ground level, when simultaneous works are permitted overhead at that very location.		
16	Materials are not thrown from heights on to ground		
17	Medical examination of workers are made & found satisfactory		
18	Responsible job engineer / supervisor found physically present at work spot for overall administration of work as well as safety of people.		

Above items have been checked & compliance has been found in place. Hence work is permitted to start / continue at the above-mentioned location. Work shall not start till identified lapses are rectified.

Additional Precautions, if any .....
.....

Work Permit issued by
Contractor Engineer/ RCM

Verification By
Contractor Safety Officer

AT THE END OF THE DAY/WORK:

All works at height are completed & workmen have returned safely from work location at (time) ..... (date) .....

(Sig. Contractor Engineer)

FORMAT NO. : HSE-7 REV 0

CONFINED SPACE ENTRY PERMIT

Project site _____ Sr. No. _____
Name of the work _____ Date _____
Name of Contractor _____ Nature of work _____
Exact location of work _____

Safety Requirements POSITIVE ISOLATION OF THE VESSEL IS MANDATORY

(A) Has the equipment been ?

Y	NR		Y	NR		Y	NR	
☐	☐	Isolated from power/steam/air	☐	☐	water flushed &/or steamed	☐	☐	radiation sources removed
☐	☐	isolated from liquid or gases	☐	☐	Man ways open & ventilated	☐	☐	proper lighting provided
☐	☐	depressurized &/or drained	☐	☐	cont. inert gas flow arranged	☐	☐	
☐	☐	blanked/ blinded/ disconnected	☐	☐	adequately cooled	☐	☐	

(B) Expected Residual Hazards

☐	☐	lack of O_2	☐	☐	combustible gas/ liquid	☐	☐	H_2S / toxic gases
☐	☐	corrosive chemicals	☐	☐	pyrophoric iron / scales	☐	☐	electricity / static
☐	☐	heat/ steam / frost	☐	☐	high humidity	☐	☐	ionizing radiation
☐	☐		☐	☐		☐	☐	

(C) Protection Measures

☐	☐	gloves	☐	☐	ear plug / muff	☐	☐	goggles / face shield
☐	☐	protective clothing	☐	☐	dust / gas / air line mask	☐	☐	personal gas alarm
☐	☐	grounded air duct/ blower/ AC	☐	☐	attendant with SCBA/air mask	☐	☐	rescue equipment/ team
☐	☐	Fire fighting arrangements	☐	☐	safety harness & lifeline	☐	☐	communication equipment
☐	☐		☐	☐		☐	☐	

Authorization / Renewal (It is safe to enter the confined space)

	No. of persons allowed	Name of persons allowed	Signature			Time		Signature
			Contractor's Supervisor	Contractor's Safety Officer		From	To	Workman

Permit Closure :

(A) Entry ☐ was closed ☐ stopped ☐ will continue on .....

(B) ☐ Site left in a safe condition ☐ Housekeeping done

(C) Multilock ☐ removed ☐ key transferred
☐ Ensured all men have come out ☐ Man-ways barricaded

Remarks, if any:

FORMAT NO. : HSE-8 REV 0

RADIATION WORK PERMIT

Project :
Name of the work :
Name of site contractor :

Sr. No. :
Date :
Job No. :

Location of work :

Source strength :

Cordoned distance (m) :

Name of Radiography agency :

Approved by Owner/EIL ☐

No. of workers engaged :
(*List enclosed with name & gate pass numbers.*)

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

S. No.	Item description	Done
	Safety regulations as per BARC/AERB ensured while source in use/in transit & during storage	
	Area cordoned off / safe working platform provided	
	Lighting arrangements for working during nights ensured	
	Warning signs/ flash lights installed	
	Cold work permit taken (if applicable)	
	PPEs like film badges, dosimeters used	

Additional precautions, if any _____

(Radiography Agency's BARC/AERB authorized Supervisor)

Permission is granted.

Permit is valid from _____ AM/PM _____ Date to _____ AM/PM _____ Date

(Signature of permit issuing authority of site contractor)
Name: Designation: Date:

Permit renewal:

Permit extended upto		Additional precautions required, if any	Sign. of issuing authority with date (of site contractor)	
Date	Time			

Work completed/ stopped/ area cleared at _____ Hrs of Date _____
(Sign. of permit issuing authority)

Name & Signature of site contractor:

FORMAT NO. : HSE-9 REV 0

DEMOLISHING/DISMANTLING WORK PERMIT

Project : Sr.No. :
Name of the work : Date :
Name of contractor : Job No. :

Name of sub-contractor : No. of workers to be engaged:
(*List enclosed with name & gate pass numbers.*)

Line No./ Equipment No./ Structure to be dismantled :

Location details of dismantling/ demolition with sketch : (clearly indicate the area)

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

S. No.	Item description	Done	Not Applicable
	Services like power, gas supply, water, etc. disconnected	☐	☐
	Dismantling/ Demolishing method reviewed & approved	☐	☐
	Usage of appropriate PPEs ensured	☐	☐
	Precautions taken for neighbouring structures	☐	☐
	First-Aid arrangements made	☐	☐
	Fire fighting arrangements ensured	☐	☐
	Precautions taken for blasting	☐	☐

(Contractor's Supervisor) (Contractor's Safety Officer)

Permission is granted.

(Permit issuing authority)

Name :
Date :

Completion report :

Dismantling/ Demolishing is completed on _____ Date at _____ Hrs.

Materials/ debris transported to identified location ☐ Tagging completed (as applicable) ☐

Services like power, gas supply, water, etc. restored ☐

(Permit issuing authority)

CONTRACTOR's NAME

FORMAT NO. : HSE-10 REV 0

DAILY SAFETY CHECKLIST

(To make use of before start of day's work)

Project :
Name of the work :
Name of contractor :

Sr. No. :
Date :
Job No. :

Description of Job decided to perform : -

- **Use of PPE / Safety Gadgets**

Sl. No	PPEs	Compliance (Yes / No)	Sl. No	PPEs	Compliance (Yes / No)
1	Safety Helmets		6	Face Shield	
2	Safety Shoes		7	Full body harness	
3	Hand Gloves		8	Fall Arrest System	
4	Dust Musk		9	Safety net	
5	Safety Goggles		10	Horizontal life-line made of steel wire, (dia not less than 8.0 mm.)	

(Serial No. 1 & 2 are compulsory for everyone. Specify & ensure use of other safety gadgets as required for the job)

- **Identify following important unsafe conditions: -**

Sl. No	Conditions	Yes / No
1	Access to work site / emergency escape clear	
2	Soil / Loose earth kept away from excavated pit / slope / ladder provided	
3	Electrical wire / welding lead lying entangled on ground / welding m/c. booth accessible	
4	Elevated work platform / open ends are protected	
5	Ground area cordoned off before lifting works or erection at height / ground area checked & cordoned-off before start of height works	
6	Structural members / erected pipes / wooden boards/pieces etc. are safely anchored at heights and are not likely to fall down on people when working beneath	
7	Rope ladders tied-up on tall steel structures, long before are removed to get rid of their use	
8	Any Other	

- **Indicate actions taken, if status of any of the above items is found "No"**

  .....
  .....

- **Specific Safety guidelines / precautions, if any** (communicated thro' TBT)

  .....
  .....

- **Above conditions and PPE compliances are checked by undersigned and correct status are indicated after verification**

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-11 REV 0

(Sheet 1 of 2)

HOUSEKEEPING ASSESSMENT& COMPLIANCE

Project :
Name of the work :
Name of contractor :
Name of contractor : Fortnightly

Sr. No. :
Date :
Job No. :

Sl. No.	Subjects of Review	Satisfactory/ Yes	Non-satisfactory/ No	Remarks	Action
1.	Cleanliness at the Main entry / access of site				
2.	Ground condition / floor areas free from water-logging / oil spillage				
3.	Ground & elevated floors free from rubbish / wastes / accumulated debris / scraps.				
4.	Manholes / openings are covered / fenced				
5.	Trenches are barricaded / walkways are in place				
6.	Drains are cleaned / not choked / not occupied by dumped materials				
7.	Sufficient CAUTION boards / instructions displayed				
8.	Construction machinery are maintained & parked in orderly manner.				
9.	Movement of site people are not obstructed because of dumping / storing of construction materials				
10.	Access/ egress to Electrical Distribution Boards/ Panels clear from wires / cables / earth-strips etc.				
11.	Electrical panel rooms / sheds / MCC / Control rooms / Substations etc. are clean & tidy and not used for storing dress / clothes, tiffin-box or bicycles.				
12.	Passage behind Elec. panels are free for access				
13.	Fire extinguishers / fire-buckets are accessible without any difficulty.				
14.	Stair-steps, platforms & landings are clear & tidy				
15.	Sheds / rooms & work areas have got sufficient illumination as well as ventilation.				
16.	Cables / Wires / welding leads are routed / hanged appropriately & are not creating unsafe condition.				
17.	Stacking / storing of insulation materials or their packing.				
18.	Removal or cleanliness of left-over sand, concrete, brick-bats, insulation-materials, excess earth, wastes etc.				
19.	Storing / stacking of sand, metal chips, re-bars, steel pipes, valves, fittings etc.				
20.	One escape route at ground & minimum two escape routes at elevation available.				

FORMAT NO. : HSE-11 REV 0

(Sheet 2 of 2)

Sl. No.	Subjects of Review	Satisfactory/ Yes	Non-satisfactory/ No	Remarks	Action
21.	Captions / Posters / Slogans on various safety instructions are displayed legibly in local language				
22.	Cable trenches are water-free or regular arrangement for taking out accumulated water exists.				
23.	Windows of rooms / offices are regularly cleaned				
24.	Facilities for cycle sheds, drinking water, washing, rest-rooms etc. are maintained in tidy manner.				
25.	Toilet, Urinals, Canteen / kitchen / pantry etc. are maintained & free from obnoxious smell.				
26.	Construction tools / tackles are stored systematically - the items are tagged / tested / certified by competent third party.				
27.	Sufficient numbers of Dust-bins / Waste-bins found at site and are regularly emptied.				

Additional remarks, if any -

.....

.....

.....

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-12 REV 0

INSPECTION OF TEMPORARY ELECTRICAL BOOTH / INSTALLATION

Project :
Name of the work :
Name of contractor :
Sub Station No:/Booth No

Sr. No. :
Date :
Job No. :
Location:

SL NO	SUBJECTS	OBSERVATION (YES /NO)	ACTION TAKEN
1	Switchboards installed properly are in order and protected from rain & water-logging.		
2	Adequate illumination provided for switchboard operation during night hours & the lamps are protected from direct human contact.		
3	Voltage ratings, DANGER signs, Shock-Treatment-Chart displayed in the installation / booth		
4	Fire extinguisher (DCP or CO_2) & Sand Bucket kept in close vicinity of Switchboards		
5	Valid License & Competent Electrician / Wireman available & name/ license no. displayed at booth / installation.		
6	General housekeeping in & around booth / installation found in order.		
7	Cable-route-markers for U/G cables provided.		
8	Monthly inspection report of Electrical hand tools available in booth / installation.		
9	Insulated Mat provided in front of Elec. Panels.		
10	Rubber hand gloves available/ used by Electricians		
11	Availability of CAUTION boards for shutdown & / or repairing works.		
12	All incoming & outgoing feeders have proper MCCB / HRC fuses / Switches.		
13	Switchboards "earthed" at two distinctly isolated locations.		
14	Switchboards have adequate operating space at the front face & at the rear face too.		
15	All connections provided through 30mA ELCB.		
16	Testing records of all ELCBs available at site		
17	Only industrial type plugs & sockets are used.		
18	Temporary connections are 3-core double insulated & free from cuts & joints and 3rd core is earthed at both ends		
19	Socket boards are properly mounted on stand & protected from water ingress.		
20	Electrical equipments operating above 250V have two earthing / double earthing.		
21	All incoming / outgoing cables are properly glanded & terminated with "lugs".		
22	Switch-boards are of industrial variety / type.		
23	Sketch for installation / connection (SLD) made & pasted& other safety labels/display boards		
24	Labeling of incoming / outgoing feeders made.		
25	All hand lamps are protected from direct contact.		
26	All electrical cable / joints are in safe condition		

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-13 REV 0

(Sheet 1 of 2)

INSPECTION FOR SCAFFOLDING

Project : Sr. No. :
Name of the work : Date :
Name of contractor : Job No. :

Sl. No	Description	Yes	No	N.A	Actions taken
1	Whether work permit is obtained to take up work at height above 1.5 Mts?				
2	Whether atmospheric condition is "stormy" or "raining" and works at heights have been permitted?				
3	Whether steel pipes scaffoldings are used for units /off-site areas?				
4	Whether scaffolding has been erected on rigid/firm/leveled surfaces / ground? Whether "foot-seals" or "base-plates" are used beneath the up-rights (vertical steel pipes)				
5	Whether scaffold construction is as per IS specification with toe-board and hand-rails (top-rail as well as mid-rail)?				
6	Whether distance between two successive up-rights are less than 2.5 Mts (height of scaffold & load carrying capacity governs the distance between two uprights)				
7	Whether all uprights are extended at least 900 mm above the top most working platform (to enable fitting of handrails)?				
8	Whether vertical distance of two successive ledgers is satisfactory? (*varying between 1.3 Mts. To 2.1 Mts)*				
9	Whether the peripheral areas of working at height are cordoned-off? (for avoiding accident to people arising out of dropped / deflected materials)				
10	Whether platform is provided? Is it safely approachable?				
11	Whether end of scaffold platform / board are extended beyond transoms? (125mm to 150 mm)				
12	Whether CE / IS approved quality and worthy conditioned full-body safety harness (with double lanyard & karabiners) are used while working at heights?				
13	Whether life-line of safety harness is anchored to an independent secured support capable of withstanding load of a falling person?				
14	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person / vehicle?				
15	Whether clamps used are of good condition, of adequate strength and free from defects?				
16	Whether ladder is placed at secured and leveled surface?				
17	Whether water-pass and oil-spills are avoided around the scaffold structure?				
18	Whether ladder is extended 1.5mts. above the landing point at height?				
19	Whether more than one access/egress provided to the scaffold?				
20	Whether ladder used are of adequate length and overlapping of short ladders avoided?				
21	Whether metallic ladders are placed much away from near-by electrical transmission line?				
22	Whether rungs of ladder are inspected and found in good order?				
23	Whether fall-arresters provided on both the access/egress routes?				
24	Whether diagonal (cross) bracings are provided at regular interval on the scaffold?				
25	Whether working platform on the scaffold has been made free from "jolt" or "gap"?				
26	Whether tools or materials are removed after completion of the day's job at heights?				
27	Whether a valid Permit for Work (PFW) is obtained before taking up work over asbestos or fragile roof?				
28	Whether sufficient precaution is taken while working on fragile roof?				

FORMAT NO. : HSE-13 REV 0

(Sheet 2 of 2)

Sl. No	Description	Yes	No	N. A	Actions taken
29	Whether provision is made to arrange duck ladder, crawling board for working on fragile roof?				
30	Whether scaffold has been inspected by qualified civil engineers prior to their use?				
31	Whether the scaffolding has been designed for the load to be borne by the same?				
32	Whether the erection and dismantling of the scaffolding is being done by trained persons and under adequate supervision?				
33	Whether safety net with proper working arrangement and life-line has been provided?				
34	Whether TAGS (Green for acceptable and Red for incomplete/unsafe scaffolds) are used on scaffolds?				
35	Whether sufficient illumination is provided in and around the scaffold and access?				
36	Whether emergency rescue / response arrangements are made in place				

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-14 REV 0

(sheet 1 of 2)

PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OF SCAFFOLDING

Project :
Name of the work :
Name of contractor :
Nature of activities :

Sr. No. :
Date :
Job No. :
Duration: From.....To.....

SL. No.	SUBJECTS / ITEMS	DONE	NOT DONE	REMARKS
1	Specific task of Erection / Modification / Dismantling of scaffolds, identified & TAGGED accordingly (before as well as after carrying-out jobs).			
2	People engaged in doing the job are identified & are certified by Job Engineer of Main Contractor as experienced / trained.			Names to be noted
3	Concerned persons are alerted by the Job Engineer of Main Contractor in connection with possible hazards & what the workmen MUST do / MUST not do.			
4	Verification by Job Engineer of Main Contractor made for confirming that all persons permitted to carry-out the jobs are making use of Helmet, Safety Shoes, Goggles, Gloves & Double lanyard safety harness and other relevant PPEs.			
5	Area of work is effectively cordoned-off / barricaded / illuminated.			
6	For taking-up / lowering down Scaffolding members / clamps / couplings etc. appropriate ropes / pulleys/ chains etc. have been arranged for use (not to throw any item) & the same have been verified as "fit for purpose".			
7	Items / members of scaffold, being lowered are removed from the area & stacked correctly.			
8	Ropes, chains, pulley blocks etc. being used for lifting or lowering scaffold items, are inspected by the Job Engineer & their certifications as well as physical conditions have been found O.K, before signing this PERMIT.			
9	Safety Net / Life-line / Fall Arresters etc. are arranged in position and Job Engineer has found working conditions favourable for activities to start.			
10	Scaffold erection or dismantling tasks are being supervised by Experienced Engineer / Competent person.			
11	Only competent & experienced people have been selected / engaged in Scaffolding erection, modification or dismantling tasks.			
12	Adequate & effective actions for traffic and movement of people around the cordoned-off area taken to avoid inadvertent incident			
13	Working platforms are protected with handrails & toe-boards.			
14	Access & Exit (for reach & escape) are safe for use by people.			
15	Tools, tackles to be used for above jobs are verified by job Engineers of Main contractor as genuinely good and tied-up at height (to prevent their fall).			
16	Site important Telephone Nos. are made known to everyone			
17	SOP (Safe Operating Procedure) for the specific task is made & followed too.			
18	Emergency vehicle has been arranged at work locations.			

- This permit for work shall be available at specific work location all the time.
- After completion of work, permit shall be returned to safety cell of main contractor, without fail.
- This Permit shall be issued maximum upto (Monday to Sunday).
- Additional Precautions, if any

  .....
- **ACCORD OF PERMISSION** (to be ticked) - YES ( ) / NO ( )

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-14 REV 0

(sheet 2of 2)

Everyday Site working conditions & performance of workmen shall be assessed / checked by Contractor Site Engr. and Safety Officer shall verify the same.

	Name / Sign.	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Site Engr.								
Safety Off.								

FORMAT NO. : HSE-15 REV 0

PERMIT FOR HEAVY LIFT / CRITCAL ERECTION

Project :
Name of the work :
Name of contractor :
Nature of activities :
Location of work :
Equipment/Structure to be erected:

Sr. No. :
Date :
Job No. :
Duration: From.....To.....
Name /Type of crane :
Wt. of equipment/ structure to be erected :

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1	Is the crane type suitable for lift or as per erection procedure?				
2	Is the crane have the correct number of counterweights fitted?				
3	Availability of Load Certification of crane from authorized agency.				
4	Is the load chart of crane available in carne cabin/or with Crane operator?				
5	Is the device to check the Wind speed in crane is working? Is the safety features in crane are working?				
6	Availability of Load certification of slings and other accessories from authorized agency				
7	Availability of Licensee/certificate for crane operator from authorized agency.				
8	Availability of approved HIRAC for the subject activities.				
9	Availability of approved erection/rigging procedures.				
10	Availability of temporary gratings/ platforms for critical lifting(as applicable)				
11	Tool Box conducted before erection?				
12	Has the area been cordoned off?				
13	Are the authorized persons during erection are identified?				
14	Does each person identified for erection understand their roles and responsibilities?				
15	Is the ground on which crane will rest or outrigger support are correct?				
16	Is hard stand requirement (if any) complied?				
17	Is the communication system (viz. walkie talkies, etc. are working properly?				
18	If more than one crane is lifting the load, is an Intermediate rigger will supervise the lift?				
19	If there is other obstruction within the operating radius of the crane, have correct precautions been taken to prevent collision?				
20	All the persons are wearing the requisite PPE?				

Inspected & Issued by
Contractor Engineer/RCM

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-16 REV 0

PERMIT FOR ENERGY ISOLATION & DE-ISOLATION

Project :
Name of the work :
Name of contractor :

Sr. No. :
Date :
Job No. :

ENERGY ISOLATION PERMIT

- Clearance required from: …….. Hrs …… Date To …….. Hrs …… Date
- Name of equipment/ energy source etc. ……
- Nature of job to be done: ……
- Area: …… Location: ……

PERMIT VALIDATION	PERFORMING AUTHORITY
I hereby authorize the ……personnel (performer) to isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for maintenance/repair. Issuing authority Area –Incharge/RCM Signature: Date: Name:	The work and precautions will be carried out under my overall responsibility.(Testing/execution engineer) Signature: Date: Name:

SAFETY PRECAUTIONS FOR CLEARANCE	NORMALISING AFTER CLEARANCE
1. Notify workers of intent to de- energize ☐ 2. Obtain lock, tag or locking/tagging devices ☐ 3. Shut down, de-energize, dissipate any residual energies. ☐ 4. Apply lock ,tag and locking and/or tagging devices ☐ 5. *Any other job specific precautions ☐ 6. Verify effectiveness of lockout by attempting to restart. ☐ 7. Proper PPE is ensured ☐ I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No: …… Lock No: …… Issuing authority Area –Incharge /RCM Signature: Date: Name: **(*to be included by contractor in consultation with EIL/owner)**	1. Notify workers of intent to re- energize ☐ 2. Conduct visual inspection to confirm that the danger zone is clear of workers ☐ 3. Conduct visual inspection to confirm that tools, equipment's danger zone is clear of workers ☐ 4. Reposition the safety devices (interlocks, valves, guards, covers, sensors, as applicable, etc.) ☐ 5. *Any other job specific normalizing details ☐ 6. Remove lock, tag and locking and/or tagging devices. ☐ 7. Re-energize. ☐ 8. Confirm system is operating properly & safely. I certify that the energy source mentioned above is isolated from all sources and is safe to start the work. Tag No: …… Lock No: …… Issuing authority Area –Incharge /RCM Signature: Date: Name: **(*to be included by contractor in consultation with EIL/owner)**

ENERGY DE-ISOLATION PERMIT

PERMIT VALIDATION	PERFORMING AUTHORITY
I hereby authorize the ……personnel (performer) to de- isolate the above equipment/energy source from all sources of power and handover the equipment/energy source for normal operation.. Issuing authority Area –Incharge/RCM Signature: Date: Name:	I hereby certify that the equipment/energy source mentioned above has been de-isolated and is ready for normal operation. (Testing/execution engineer) Signature: Date: Name: Countersigned by Issuing authority

FORMAT NO. : HSE-17 REV 0

PERMIT FOR EXCAVATION (depth 2m and above)

(Sheet 1of 2)

Project :
Name of the work :
Name of contractor :
Job Description :
Size of excavation :

Sr. No. :
Date :
Job No. :
Location:

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1	Suitable and sufficient risk assessments and method statements has been carried to ensure that the work shall be undertaken in accordance with specification and standard.				
2	Are plans/details of underground services available and the same has been reviewed?				
3	Has survey done to locate the services/obstacles etc.				
4	Has the live services (electrical, water line, air line, telephone line, etc.) has been disabled for carrying out the job.				
5	Is adequate barriers/ fences to protect the excavation are in place?				
6	Is Adequate warning signs are in place?				
7	Is Assessment of ground conditions done and remedial action (if any) taken?				
8	Safe access / egress (e.g. ramp / steps / ladders etc.) provided for site workmen & supervisors.				
9	Is the excavation work being undertaken in proximity of structure, etc.? If Yes, it's effect is considered?				
10	Availability of competent person for supervising the excavation work?				
11	Adequate safe arrangement to prevent collapse of edges (e.g. shoring / strutting / benching / sloping etc.) made at site.				
12	Hard barricades (at least 1.0M away from edge & for excavation near site access roads) with warning signs/caution boards are provided				
13	Accumulation / passage-ways of water at periphery of excavation / trench stopped/ restricted.				
14	Is the equipment being used for excavation has been checked for adequacy and is in good working condition having all the safety features?				
15	Age & fitness of workmen ensured by medical test before engagement in job?				
16	Arrangement of Monitoring of possible oxygen deficiency or obnoxious gases done & action taken?				

PERMIT GRANTED - Yes / No

(*List enclosed with name & gate pass numbers.*)

Name & Signature of Site Engr.
Contractor (Initiator)

Name & Signature of Safety Officer
Contractor (Issuing authority)

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PERMIT FOR EXCAVATION

(Sheet 2of 2)

NOTES: -

1. Slopes or benches for excavation beyond 2.0M depth shall be designed & approved by Contractor's site head.
2. Excavated earth to be kept at least 1.5M away from edges.
3. Safety helmets, Safety shoes or gum-boots, gloves, goggles, Face shield, Safety Harness shall be essential PPEs.
4. Permit shall be made in **duplicate** and original shall be available at site of work.
5. Permit shall be issued for maximum **one week** only (Monday to Sunday).
6. After completion of works, permit shall be closed & preserved for record purpose.

GRANT OF PERMIT AND EXTENSIONS

Sl. No.	Validity period From ____To ____	Working Time From _____To _____	Initiator (site Engr. of Main Contractor)	Issuing authority (Safety Officer of Main Contractor)	Review by EIL / Owner (Remarks with date
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Additional safety instructions if any: -

1.

2.

3.

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IDENTIFICATION OF ENVIRONMENTAL ASPECTS, IMPACT ASSESSMENT AND CONTROL MEASURES

S. No	Activity	Environmental Aspect	N/A/E	Environment Impact	Control Measures	Consequences						Risk Level	Significant	Gaps/ Recommendations
						A	B	C	D	E	F	G	Yes/No	

INITIAL ENVIRONMENT REVIEW TECHNIQUE

Environmental Impacts	AP = Air Pollution	WP = Water Pollution	LC = Land Contamination	DNR = Depletion of Natural Resources	NP = Noise Pollution

Scale	Quantity (A)	Occurrence (B)	Severity of Impact (C)	Detection (D)	Control (E)	Legal and other requirements (F)
1	Negligible	Very Rare	Negligible visual impact	Immediately	Available & effective at place	In compliance or not applicable
2	Low	Once a month or less	Causes Discomfort or Nuisance	Within 1 hour	Has in-built Secondary control	
3	Moderate	Once a day	Resource Depletion	Within 8 hours	Needs human Intervention	
4	High	Several times a Day	Affects Aquatic Life, flora, fauna or global issue	Within 24 hours	Mechanism in place but not reliable	
5	Excessive	Continuous	Human health effect	More than 24 hours	Absent or no effective control	Not in compliance

Risk Level - G : A x B x C x D x Ex F

Aspects with score of 100 and above are considered as significant.
Also, Irrespective of the score, all legal noncompliance's to be considered as significant

Condition	
N	NORMAL
A	ABNORMAL
E	EMERGENCY

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RISK IDENTIFICATION						DESIRED CONTROLS & EXISTING GAPS, IF ANY		RISK ASSESSMENT				RECOMENDED CONTROL ACTIONs TO REDUCE THE RISK LEVEL	ACTION BY	REMARKS
S. No.	Activity	Activity type (R/NR)	Hazards	Condition (N/AN/E)	Associated Risk	Desired Control Measures	Gaps If Any	Probability (P)	Impact (I)	Risk R= P*I	Risk Classification			

Likelihood – Possibility of occurrence of risks based on present gaps (technological / operational / competence / measurement and monitoring);

UL: Unlikely, **L:** Likely, **VL:** Very Likely, **FR:** Frequent, C: Continuous

Impact –

SI: Slight Injury, **MI:** Minor Injury, **MJ:** Major Injury, **SF:** Single Fatality, **MF:** Multiple Fatalities

Level of consequence – Refer Guidance criteria for this i.e. possible degree of damage;

Condition- N: Normal, **AN**: Abnormal, E-Emergency

Activity Type: R- Routine, **NR**- Non Routine

RISK –

L: Low Risk, **M:** Moderate Risk, **H:** High Risk

RECORD OF REVISION

CLAUSE No.	Rev No.	Brief of Revision	Date
All	00	New procedure introduced	31.03.2018