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X	Daily Safety Checklist	HSE-10 Rev.0
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XIII	Inspection for Scaffolding	HSE-13 Rev.0
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1.0 SCOPE

This specification establishes the Health, Safety and Environment (HSE) management requirement to be complied by Contractors/Vendors including their sub-contractors/sub vendors during construction.

This specification is not intended to replace the necessary professional judgment needed to design & implement an effective HSE system for construction activities and the contractor is expected to fulfill HSE requirements in this specification as a minimum. It is expected that contractor shall implement best HSE practices beyond whatever are mentioned in this specification.

Requirements stipulated in this specification shall supplement the requirements of HSE Management given in relevant Act(s)/ Legislations, General Conditions of Contract (GCC), Special Conditions of Contract (SCC) and Job (Technical) Specifications. Where different documents stipulate different requirements, the most stringent shall apply.

2.0 REFERENCES

The document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers Act, (Refer Appendix-D)
- Indian Factories Act,(Refer Appendix-D)
- Job (Technical) specifications
- Relevant International/ National Codes (refer Appendix-A for standards/codes on HSE)
- Relevant State & National Statutory requirements.
- Operating Manuals Recommendation of Manufacturer of various construction Machineries
- Occupation Health and Safety Management System (OHSAS 18001:2007/ISO 45001) and Environmental Management System (ISO 14001:2015)

3.0 REQUIREMENTS OF HEALTH, SAFETY & ENVIRONMENTAL (HSE) MANAGEMENT SYSTEM TO BE COMPLIED BY BIDDERS

3.1 Management Responsibility

3.1.1 HSE Policy & Objectives

The Contractor should have a documented and duly approved HSE policy &objectives to demonstrate commitment of their organization to ensure health, safety and environmental aspects in their line of operations.

The Contractor's senior management shall provide strong visible leadership and continuously demonstrate commitment to develop, operate and maintain, review and continually improve a HSE culture at site which empowers individuals to take responsibility for their safety and embrace and accept nothing but responsible HSE behaviour.

Contractor shall refer in clause No. 3.3.23 for Key Performance Indicator (KPI).

3.1.2 Management System

The HSE management system of the Contractor shall cover the HSE requirements & commitments to fulfill them, including but not limited to what have been specified under clauses 1.0 and 2.0 above. The Contractor shall obtain the approval of its site specific HSE Plan from EIL/ Owner prior to commencement of any site works. Corporate as well as Site management of the Contractor shall ensure compliance of their HSE Plan at work sites in its entirety in true spirit.

3.1.3 Indemnification

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Contractor shall indemnify & hold harmless, Owner/EIL & their representatives, free from any and all liabilities arising out of non-fulfillment of HSE requirements or its consequences.

3.1.4 Deployment &Qualifications of Safety Personnel

The Contractor shall designate/deploy various categories of HSE personnel at site as indicated below insufficient number. In no case, deployment of safety Supervisor / Safety Steward shall substitute deployment of Safety Officer / Safety Engineer what is indicated in relevant statute of BOCW Act i.e. deployment of safety officer/Safety Engineer is compulsory at project site. The Safety supervisors, Safety stewards/Observer etc. would facilitate the HSE tasks at grass root level for construction sites and shall assist Safety Officer /Engineers.

Contractor shall appoint safety personnel as given below for every work shift:

(i) Safety Observer/Steward: Contractor shall depute one Safety Observer/Steward for every 100 workers or part thereof

(ii) Safety Supervisor: In addition to above(i), contractor shall depute one Safety Supervisor for every 250 workers or part thereof

(iii) Safety Engineer: In addition to above (i&ii), one safety engineer/ officer for every 1000 workers or part thereof.

Contractor shall intimate/obtain prior permission from EIC before demobilizing any safety personnel. The Contractor shall mobilize suitable safety personnel as replacement.

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:

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(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 one year diploma in Industrial safety(from any Indian Institutes recognized by AICTE or State Council of Tech. Education of any Indian State/Union territory) with at least one paper in construction safety (as an elective subject).

(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 **or** Chemistry and degree or one year diploma in Industrial Safety (from any Indian institutes recognized by AICTE or State Council of Tech. Education of any Indian State/ Union Territory) with practical experience of working in a building, plant or other construction works (as Safety Officer, in line with Indian Factories Act, 1948) 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 EIL/Client and 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.

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 Contractor are physically deployed at site. The Contractor shall submit a HSE Organogram clearly indicating the lines of responsibility and reporting system and elaborate the responsibilities of safety personnel in their HSE Plan.

Upon fulfilling the basic requirement of qualification and relevant experiences, the performance of contractor HSE personnel's is to be monitored.

The good performing contractor's HSE personnel at site shall be rewarded upon assessment of performance by EIL/Owner. The non-performing HSE personnel shall be counselled by EIL/Owner & suitable action may be taken for suspension from site for 3-6 days. Contractor shall arrange training for non performing HSE personnel.

HSE In –Charge of the contractor shall be given the status at par with the other heads of department and shall report to Head of Project.

The Contractor shall verify & authenticate credentials of such safety personnel and furnish Bio-Data/Resume/Curriculum Vitae of the safety personnel as above for EIL/Owner's approval, at least 1 month before the mobilization. The Contractor, whenever required, shall arrange submission of original testimonials/certificates of their Safety personnel, to EIL/Owner (for verification/scrutiny, etc.)

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Imposition/ Realization of penalty shall not absolve the Contractor from his/her responsibility of deploying competent safety officer at site.

Adequate planning and deployment of safety personnel shall be ensured by the Contractor so that field activities do not get affected because of non-deployment of competent & qualified safety personnel in appropriate numbers.

3.1.5 **Implementation, Inspection/Monitoring**

a) The Contractor shall be fully responsible for planning, reporting, implementing and monitoring all HSE requirements and compliance of all laws & statutory requirements.

b) The Contractor shall also ensure that the HSE requirements are clearly understood & implemented conscientiously by their site personnel at all levels at site.

c) The 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 Contractor at critical work spot during the course of work may invite halting / stoppage of work.

d) The Contractor shall regularly review inspection report internally and implement all practical steps / actions for improving the status continuously.

e) Contractor skilled workmen like riggers, scaffold erectors, welders, crane operators etc. should have sufficient past experience and skill on the relevant job.

f) The 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.

g) The 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.

h) Adequate records for all inspections shall be maintained by the Contractor and the same shall be furnished to EIL/Owner, whenever sought.

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

j) As a general practice lifting tools/tackles, machinery, accessories etc. shall be inspected, tested and examined by competent person(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. Hydraulic Mobile Crane, 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 contractor. 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 Contractor shall not make use of arbitrarily fabricated 'derricks' at project site for lifting/ lowering of construction materials.

k) 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, First-aid centers, urinals/toilets, etc. should be periodically inspected by Contractor (preferably utilizing HR/Admin. personnel to inspect site welfare facilities) and records to be maintained.

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3.1.6 **Behaviour Based Safety**

a) The contractor shall develop a system to implement Behavior-Based Safety (BBS) through which work groups can identify, measure and change the behaviors of employees and workers towards construction safety aspects.

b) The BBS process shall include the following:
- Identify the behaviors critical to achieve required safety performance.
- Communicate the behaviors and how they are performed correctly byall
- Observe the work force and record safe/at risk behaviors. Intervene with workers to give positive reinforcement when unsafe behaviors are observed. Provide coaching/correction when at risk behaviors 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 behavior improvements occur
- Change behaviors to be observed or change activators or change consequences as appropriate.
- Communicate any changes to workforce

c) Contractor through its own HSE committee shall implement the above process.

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

e) The HSE committee of contractor shall observe individual's behavior for safe practices adapted for utilization/execution of work for followings a minimum:-
- PPE
- Tools & equipment's
- Hazard Identification & control
- House keeping
- Confined space entry
- Hot works
- Excavation
- Loading & unloading
- Work at height
- Stacking & storage
- Ergonomics

f) EIL/Owner and Contractor's site staff at all levels shall monitor the behavior of contractor employees that create and/or contribute to the unsafe situations at work place.

g) Contractor shall arrange Behavior Based safety (BBS) training of their employees at site on yearly basis.

3.1.7 **Awareness and Motivation**

a) The Contractor shall promote and develop awareness on Health, Safety and Environmental protection among all personnel working for the Contractor.

b) The contractor shall display safety statistics board at all prominent location .Also shall provide dedicated notice board for displaying of safety alerts or any other safety related notices for awareness site workforces.

c) Regular awareness programs and fabrication shop/work site meetings at least on monthly basis shall be arranged on HSE activities to cover hazards/risks involved in various operations during construction.

d) Contractor's workmen & supervisory staff shall participate in common Tool Box Meeting as & when organized/required at site to avoid any incident/accident or occupational disease arising out of multidisciplinary jobs/activities being performed by various contracting agencies in the same location at different elevation.

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e) Contractor to motivate & encourage the workmen & supervisory staff by issuing/ awarding them with tokens/ gifts/ mementos/ monetary incentives/ certificates etc. The motivational program shall be organized on regular basis.

f) 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

g) Life Saving Rules (refer Appendix-I for details) are to be displayed at prominent location of site.

3.1.8 **Fire Prevention & First-Aid**

The Contractor shall deploy First aider & suitable First-aid measures such as First Aid Box (Refer Appendix-B for details), stand-by Emergency Vehicle. Additionally separate ambulance with trained personnel/male or female nurse to administer First Aid shall be provided by the Contractor beyond deployment of 500 workmen during day/night working hours.

a) The Contractor shall arrange installation of fire protection measures such as adequate number of steel buckets with sand & water and adequate number of appropriate portable fire extinguishers (Refer Appendix-C for details) to the satisfaction of EIL/Owner.

b) The Contractor shall arrange EMERGENCY MOCK DRILL like fire, bomb threat, gas leakage, earth quake, etc. at each site at least once in three months, involving site workmen and site supervisory personnel & engineers. The Contractor shall maintain record of such mock drills at project site.

c) The contractor shall require to tie-up with the hospitals located in the neighborhood for attending medical emergency.

3.1.9 **Documentation**

The Contractor shall evolve a comprehensive, planned and documented system covering the following as a minimum for implementation and monitoring of the HSE requirements and the same shall be submitted for approval by owner/EIL.

- HSE Organogram
- Site specific HSE Plan
- Safety Procedures, forms and Checklist. Indicative list of HSE procedures is attached as Appendix :H
- Inspections and Test Plan
- Risk Assessment & HIRAC for critical works.
- HIRAC Register as per Format no: HSE-19 to identify, assess, analyze & mitigate the construction hazards& incorporate relevant control measures before actually executing site works.
- Environmental Aspect Impact Register as per Format no: HSE-18 (identify, assess, analyze & mitigate the environmental impact & incorporate relevant control measures).
- Legal Register to identify and comply to all applicable HSE related legal requirements.

The monitoring for implementation shall be done by regular inspections and compliance of the observations thereof. The Contractor shall get similar HSE requirements implemented at his sub-contractor(s) work site/office, if applicable. However, compliance of HSE requirements shall be the responsibility of the Contractor. Any review/approval by EIL/Owner shall not absolve contractor of his responsibility/liability in relation to fulfilling all HSE requirements.

3.1.10 **Audit**

Safety Audit shall be conducted at initial stage by EIL/Owner to understand the readiness to start the job after mobilization of contractor's RCM at site& Suitable action shall be taken by contractor to comply the audit observation(s).

The Contractor shall submit an Audit Plan to EIL/Owner indicating the type of audits covering following as minimum:

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a) Internal HSE audits regularly on six monthly basis by engaging internal qualified auditors (viz. safety officers/Construction personnel having 5years experience in construction safety and Lead Auditor Course: OHSAS 18001/ISO 45001 certification).However, minimum two internal HSE audit will have to be conducted irrespective of time period of the contract.

b) External HSE audits regularly on yearly basis by engaging authorized auditing agencies (viz. National Safety Council etc.)or qualified external auditors (viz safety officers/Construction personnel having 10years experience in construction safety and Lead Auditor Course: OHSAS 18001/ISO 45001certification). However, minimum one external HSE audit will have to be conducted irrespective of time period of the contract.

c) EIL/Owner may participate in Opening and closing meeting of external audits and provide inputs to the external auditor. Outcome of external audit shall be discussed during HSE Meeting with EIL/Owner.

All HSE shortfalls/ non-conformances on HSE matters brought out during review/audit, shall be resolved forthwith(generally within a week) by Contractor& compliance report shall be submitted to EIL/Owner.

In addition to above audits by contractor, the contractor's work shall be subjected to HSE audit by EIL/Owner at any point of time during the pendency of contract. The Contractor shall take all actions required to comply with the findings of the Audit Report and issue regular Compliance Reports for the same to OWNER/ EIL till all the findings of the Audit Report are fully complied.

Failure to carry-out HSE Audits& its compliance (internal & external) by Contractor, shall invite penalization.

3.1.11 **Meetings**

i. The Contractor shall ensure participation of his top most executive at site (viz. Resident Construction Manager / Resident Engineer/ Project Manager / Site-in-Charge) along with safety officer in Safety Committee/HSE Committee meetings arranged by 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 EIL/Owner 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 Contractor, as deemed fit as per Contract. The obligation of compliance of any observations during the meeting shall be always time bound. The Contractor shall always assist EIL/Owner to achieve the targets set by them on HSE management during the project implementation.

ii. In addition, the Contractor shall also arrange internal HSE meetings chaired by his top most executive at site on fortnightly basis and maintain records. Such internal HSE meetings shall essentially be attended by field engineers / supervisors including safety personnel of the Contractor and its associates. Records of such internal HSE meetings shall be maintained by the Contractor for review by EIL/Owner or for any HSE Audits.

iii. 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.

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3.1.12 Intoxicating drinks & drugs and smoking

a) The Contractor shall ensure that his staff members & workers (permanent as well casual) shall not be in a state of intoxication during working hours and shall abide by any law relating to consumption & possession of intoxicating drinks or drugs in force.

b) The Contractor shall not allow any workman to commence any work at any locations of project activity who is/are influenced / effected with the intake of alcohol, drugs or any other intoxicating items being consumed prior to start of work or working day.

c) Awareness about local laws on this issue shall form part of the Induction Training and compulsory work-site discipline.

d) The Contractor shall ensure that all personnel working for him comply with "No-Smoking" requirements of the Owner as notified from time to time. Cigarettes, lighters, auto ignition tools or appliances as well as intoxicating drugs, dry tobacco powder, etc. shall not be allowed inside the project / plant complex.

e) Smoking shall be permitted only inside smoking booths, if any, exclusively designated & authorized by the Owner/EIL.

3.1.13 Penalty

The 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, EIL/Owner may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty.

The amount of penalty to be levied against defaulted Contractor shall be up to a cumulative limit of

2.0% (Two percent) of the contract value for Item Rate or Composite contracts with an overall ceiling of 1,00,00,000(Rupees One Crore).

0.5% (Zero decimal five percent) of the contract value for LSTK, OBE, EPC,BOO/BOOT, EPCC or Package contracts with an overall ceiling of 10,00,00,000(Rupees Ten Crores.)

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 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 like Helmet, Safety Shoes, and other safety gadgets as applicable as per nature of work.	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

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Sl. No.	Violation of HSE Norms	Penalty Amount
5.	Working at height without full body harness, using non-standard/ rejected scaffolding and not arranging fall protection arrangement as required, like hand-rails, 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.1,000/- 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.5,000/-per occasion
8.	No fencing/barricading of excavated areas / trenches.	Rs.5,000/- 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 on erected scaffolds.	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.3,000/-per occasion per day
12.	Absence of 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 EIL/Owner& failure to nominate his immediate deputy for such HSE meetings.	Rs.10,000/- per meeting
13.	Failure to maintain HSE records by 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 Contractor's Site Engineer &safety officer), internal HSE meeting, internal HSE Awareness/Motivation Program and Site HSE Training at predefined frequencies (as approved in HSE Plan).	Rs.10,000/- per occasion
15.	Failure to fill online/submit the monthly HSE report by 5th of subsequent month to Engineer-in-Charge/ Owner	Rs10,000/-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 time-frame.	Rs.20,000/- per occasion
18.	Degradation of environment (not confining toxic spills, spilling oil/lubricants onto ground)	Rs.10,000/- per occasion

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Sl. No.	Violation of HSE Norms	Penalty Amount
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 in case of man-power more than 500 or not providing dedicated emergency vehicle in case of man-power less than 500.	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 (for internal audit &OSA). Rs.30,000/-per occasion for external audit
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 Hydraulic Mobile Crane /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 EIL/Owner.

Note: Penalty amount deducted from the contractor shall be utilized by owner/EIC for the promotion of the safety during the currency of the project.

The 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 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 information to EIL & Owner) by the concerned Contractor.

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 Contractor to enhance HSE awareness/skill including feedback on the mistakes/ flaws. Any further violation of HSE stipulations by the erring individuals shall call

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for his forthright debar from the specific construction site. A record of warnings for each worker/employee shall be maintained by the 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 Contractor.

3.1.14 **Accident/ Incident investigation**

All accidents/incidents shall be informed to EIL/Owner at least telephonically by Contractor immediately and in writing within 24 hours on Format No. HSE-2 as applicable, by Contractor. Thereafter, a Supplementary Accident/Incident investigation Report on Format No. HSE-3 shall be submitted to EIL/Owner 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 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 EIL/Owner. Owner/EIL shall have the liberty to independently investigate such occurrences and the Contractor shall extend all necessary help and cooperation in this regard. EIL/Owner shall have the right to share the content of this report with the outside world.

3.2 House Keeping

The 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.

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) Protective measures to be ensured with projected rebar by suitable means.

j) 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.

k) The 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.

l) 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.

m) 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.

n) Upkeep/cleaning of site to be carried out on regular basis by the contractor. Contractor shall earmark the area for waste/scrap disposal and ensure that all waste/scrap arising out of the day's work is properly disposed to the earmarked area.

o) Hazardous waste shall be segregated and shall be kept separately at designated place.

p) Contractor shall present the status of housekeeping in HSE meeting.

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The 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 Contractor shall provide supervisor for housekeeping exclusively for management of day-to-day housekeeping activities.

3.3 HSE Measures

3.3.1 Construction Hazards

The 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. Contractor 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 equipment's (Hydraulic Mobile Crane, 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, equipment's/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) Grit Blasting activity
gg) Catalyst loading/unloading
hh) Erection/dismantling of scaffolding
ii) Chemical cleaning

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The necessary HSE measures devised shall be put in place, prior to start of an activity &also shall be maintained during the course of works, by the 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.**

3.3.2 Accessibility

h) The 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 EIL/Owner.

i) The 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.

j) A ladder or step- ladder must have a level and firm footing, in case of use of fixed ladders, sufficient foot hold and hand hold to be provided.

k) 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.

l) Accessibility to 'confined space' shall be governed by specific system / regulation, as established at project site.

3.3.3 Personal Protective Equipment (PPEs)

a) The Contractor workmen shall be permitted entry inside the project premises only with proper PPEs.

b) The 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), High ankle safety shoes with steel toe cap and antiskid sole, Coverall, full body harness (CE 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 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.

c) Owner/EIL may issue a comprehensive color scheme for helmets to be used by various agencies. The Contractor shall follow the scheme issued by the owner/EIL and shall choose colour other than white (for Owner) or blue (for EIL). All HSE personnel shall preferably wear dark green band on their helmet or green color safety 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.

d) Florescent jackets with respective company logo to be worn by the contractor workmen with different color coding for categories like supervisor and workmen.

e) Workers required using or handling alkalies, acid or other similar corrosive substance at site shall be provided with appropriate protective equipment, in accordance with MSDS.

f) 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.

g) For off-shore jobs/contracts, contractor shall provide PPEs (new) of all types to EIL & Owner's personnel, at his (contractor's) cost. All personnel shall wear life jacket at all time.

h) An indicative list of HSE standards/codes is given under **Appendix-A**.

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i) Contractor shall ensure procurement & usage of following safety equipment's/ accessories (conforming to applicable IS mark / CE standard) by their staff, workmen & visitors including their subcontractors all through the span of project construction / pre-commissioning/ Commissioning:-

i. PPEs (Helmet with company name/logo, Safety Goggles, Coverall, Ear-muff, Face Shield, Hand Gloves, High Ankle Safety Shoes, Gum Boot etc.)
ii. Barricading tape / warning signs
iii. Rechargeable Safety torch (flame-proof)
iv. Safety nets (with tie-chords)
v. Fall arresters
vi. Emergency Man-basket/rescue kit for height works
vii. Portable ladders (varying lengths)
viii. Life-lines (steel wire-rope, dia. not less than 8.0 mm)
ix. Full body double lanyard Safety harness with Rebar/ladder hook or scaffolding hook.
x. Lanyard
xi. Karabiner
xii. Retractable fall arresters (various length)
xiii. Portable fire extinguishers (DCP type) – 5 kg&10 kg capacity
xiv. Portable Multi Gas detector
xv. Sound level meter
xvi. Digital lux meter
xvii. Fire hoses & flow nozzles
xviii. Fire blankets/ Fire retardant cloth (with eyelets)
xix. Flame retardant/Flame resistant coverall-based on hazard identification & risk assessment, if required.

3.3.4 **Working at height**

a) The Contractor 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. Contractor's Safety Officer shall verify compliance status of the items of permit document after implementation of action is completed by Contractor'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.

b) 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.

c) All personnel shall be medically examined & certified by registered doctor, confirming their 'medical fitness(Vertigo or epilepsy must be covered under test report)for working at height. Contractor shall develop the model for conducting vertigo test. The fitness examination shall be done once in six months. Sticker for "PASS FOR HEIGHT WORK" shall be pasted on the safety helmet of the site personnel.

d) In case work is undertaken without taking sufficient precautions as given in the permit, EIL/Owner Engineers may exercise their authority to cancel such permit and stop the work till satisfactory compliance/rectification is arranged made. Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the

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used permits for verification during audits etc.

e) The 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. All the fall arrest systems should be cleaned after use and stored in a clean &dry area. Defective Safety Harness, lanyards & life line must be discarded from workplace and record to be maintained.

f) The Contractor shall ensure that Full body harnesses with double lanyards conforming EN361 and having authorized CE 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.

g) The Contractor shall provide Roof Top Walk Ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages and falls.

h) The 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.

i) 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.

j) 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.

k) 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.

l) Hanging Platform, manufactured by Standard HSE equipment vendors must be encouraged for painting of Buildings etc.

m) 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.

n) The Contractor shall install temporary lightening arrester in tall structures during construction to save human life and to avoid damage to equipment's& machineries. During the possibility of a thunderstorm, all the work at height where a person can be exposed to lightning shall be stopped.

o) To the extent possible use Roller arrangement to shift overhead pipes from one end to other in Pipe Racks Area.

p) Providing of steel scaffold stair tower system with landings at regular intervals as and when required for height work.

q) The 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.

3.3.5 Scaffoldings& Barricading

a) 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

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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 ladder shall be inspected before use for cracked or split stiles, missing, broken, loose or damaged rungs & splinters. The ladder shall be of adequate length to enable it to extend to at least 1.0m above the landing place or working point. Metallic ladders shall be only used as access.

b) The Contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Main 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 reserves the right to ask the Contractor to submit certification and or design calculations from his Head Office/ Design/Engineering expert regarding load carrying capacity of the scaffoldings. All steel tubing, couplers and fittings used for scaffolding shall conform to IS 3696 or an acceptable equivalent. Only metallic scaffold boards shall be allowed to use. Steel tubes shall be free from cracks, splits. Surface flaws & other defects. All couplers & fittings shall be properly oiled and maintained. Nuts shall have a free running fit on their bolts. Bolts with worn or damaged thread shall be replaced.

c) All scaffolds shall be inspected by a competent Scaffolding Inspector (person with scaffolding related experience in construction field and having a training of scaffolding supervisor from a institute/agency like National Safety Council etc.). 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 Contractor and may invite penalization from EIL/Owner. For every 120-125 m^2 /m^3 area / volume or its parts thereof minimum one TAG shall be provided.

d) 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.

e) Scaffolding shall be constructed using foot seals or base plates only. Base plates shall be used below each standard on surface .Sole plate of timber shall be used beneath the base plate to achieve greater load distribution.

3.3.6 **Electrical installations**

a) 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

b) All electrical installations shall be approved by the concerned statutory authorities.

c) All temporary electrical installations / facilities shall be regularly checked by the licensed/competent electricians of the 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.

3.3.6.1 The Contractor shall meet the following requirements:

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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. ELCB tester /test meter shall be used for testing the ELCBs operation. ELCBs testing shall be carried out by using ELCB tester on monthly basis but in specific cases like heavy rain as decided by owner/EIC. Record of the testing shall be maintained.

m. Regular inspection of all installations at least once in a month. (**Ref. Format HSE-12**).

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

a. 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.

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b. 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.

c. 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. ELCB/RCCB (Residual Current Circuit Breaker) must be fitted with all Electrical installation. The earth leakage devices shall have an operating current not exceeding 30 mA.

d. All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.

e. All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.

f. Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm^2 copper shall be used for all single phase hand tools.

g. Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.

h. All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multi-strand wires / cables.

i. Cables shall be free from any insulation damage.

j. 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 atleast 2.1 M high. Minimum head clearance of 6 meters shall be provided at road crossings.

k. 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.

l. All cable joints shall be done with proper jointing kit. No taped/temporary joints shall be used.

m. An independent earthing facility should preferably be established within the temporary installation premises. All appliances and equipment shall be adequately earthed. In case of armored cables, the armour shall be bonded to the earthing system. IS: 3043 Code for earthing practices shall be followed at project site.

n. All cables(green colour) and wire rope used for earth connections shall be terminated through tinned copper lugs.

o. 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. Periodical check tests of all electrodes should be carried out and record shall be maintained of such checks.

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p. Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.

q. ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

3.3.7 Welding/ Grinding/Gas cutting

a) 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.

b) All cylinders shall be mounted on trolleys and provided with a closing key. Empty & filled-up 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.

c) The burner and the hose placed downstream of pressure reducer shall be equipped with Flash Back Arrester/Non Return Valve device.

d) 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.

e) At end of work, the cylinders in use shall be closed and hoses depressurized.

f) Cutting of metals using gases, other than oxygen &acetylene, shall require written concurrence from Owner.

g) Grinding activity shall not be carried out in confined spaces without a valid work permit.

h) All grinding/cutting machines shall be guarded and fitted with Dead-Man switch and this shall not be bypassed any time.

i) All welding/grinding machines shall have effective earthing at least at distinctly isolated two points.

j) 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.

k) 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, Hydraulic Mobile Crane or other mobile construction machinery.

l) 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 Fire retardant blanket shall be woven from ceramic yarn with eyelets.

m) The 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.

n) All gas cylinders must have a cylinder cap on at all times when not in use.

3.3.8 Ergonomics and tools & tackles

a) The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health. Competency of the crane operator to be thoroughly checked prior to engaging in crane operation.

b) 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 Owner/EIL for their review/acceptance before the lifting tools, tackles,

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equipment, trailers, trucks/dumpers, accessories and cranes are used. Third party inspection certificate is mandatory for all lifting tools & tackles before put into use.

c) Load testing of Cranes by competent person must be made mandatory after each modification/alteration of crane configuration/change in boom length. All heavy equipment's including cranes must be maintained in good condition &record of such maintenance shall be maintained. Routine preventive maintenance of the crane to be carried out& record to be maintained for such preventive maintenance. Healthiness of the crane to be checked by Crane Expert on regular basis as per manufacturer guidelines.

d) HIRAC/JSA for assembly/dismantling activity of the crane to be submitted for approval of EIC.

e) No one should stand/work below the mast & boom of the crane. Mast of the crane should not be used for unintended lifts.

f) Mast of the crane to be kept in right position during dismantling activity of the crane.

g) Log book of all crane to be maintained.

h) Only authorized person shall be allowed to give signal to the operator.

i) Lifting/Loading/Unloading activities shall be carried out by the trained riggers under supervision of rigging Foreman.

j) Prior to marching/movement of the crane, obstructions free access/route to be ensured.

k) Skilled Technician to be engaged for AC gas checking and refilling of refrigerant and should follow the safe operating procedure for cranes.

l) Manufacturer's instructions to be followed without any deviation.

m) The contractor shall not be allowed to use defective equipment or tools not adhering to safety norms.

n) Adequate capacity of Chain pulley blocks with valid TPI certificate to be used for lifting/lowering/dragging/erection of piping material .

o) Colour coding system for lifting tools & tackles shall be followed on quarterly basis for a particular colour as mentioned below:

Period	Colour Code
January, February, March	Blue
April,May, June	Yellow
July, August, September	Green
October, November, December	Orange
For Quarantine (Unsafe Tools & Tackles)	Red

Contractor shall arrange non-sparking tools for project construction works in operating plant areas / hydrocarbon prone areas.

i. Wherever required the 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.

ii. 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.

iii. The contractor shall be responsible for safe operations of different equipments mobilized and used by him at the workplace like transport vehicles, Tower Crane, engines, cranes, mobile ladders, scaffoldings, work tools, etc. Strictly avoid standing close to Hydraulic Mobile Crane/vehicles tyres during operation.

iv. The contractor shall deploy cranes in good working condition of maximum allowable years of service from the year of manufacture as specified below: -

20 years for cranes of 50 MT & below capacity,25 years for 51 MT to 100 MT,30 years for cranes above 101 MT.

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v. In general Man basket shall not be lifted by Hydraulic Mobile Crane. Generally Crane shall be used for lifting the man basket.

vi. Tower Crane, Crane, Hydraulic Mobile Crane or equivalent, Hydraulic Rig &Boom Lift shall be inspected on fortnightly basis as per Format No. HSE-20, HSE-21, HSE-22, HSE-23 & HSE-24.

vii. The Contractor shall arrange periodical training for the operators of Hydraulic Mobile Crane, crane, excavator, mobile machinery, Tower Crane, etc. at site by utilizing services from renowned manufacturers.

viii. Hydraulic Mobile Crane or equivalent having steering control mechanism shall be permitted at construction site only for the purpose of loading/unloading. However, continuous rigger availability during marching of hydraulic crane at site shall be ensured by contractor.

3.3.9 Occupational Health

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

b) For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.

c) To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.

d) 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.

e) 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.

f) Fuelling of construction equipments/Diesel Generator set shall be carried out by hand operated pump.

g) In view of the congested working environment and associated hazards, deployment of manpower/machineries shall be in staggered manner keeping adequate safe distance between two adjacent work spot.

h) For jobs like drilling/demolishing/dismantling/steam blowing/cardboard blasting etc. where noise pollution exceeds the specified limit of 85decibels, ear muffs shall be provided to the workers. The Noise level monitoring record shall be maintained.

i) To avoid work related upper limb disorders (WRULD) and backaches, Display Screen Equipments' 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.

j) The 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. EIL/Owner reserves the right to ask the 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 Contractor.

k) The Contractor shall arrange Medical Camps at regular intervals at work sites and labor colonies to assess health condition of workers.

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l) The Contractor shall ensure vaccination of all the workers including their families, during the course of entire project span.

3.3.10 Hazardous substances

a) 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 labeled 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.

b) 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.

c) 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 EIL/ Owner.

3.3.11 Slips, trips & falls

a) The 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 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.

b) 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 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.

3.3.12 Radiation exposure

a) 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.

b) For Open Field Radiography works, requirements of Bhabha Atomic Research Centre (BARC)/ Atomic Energy Regulatory Board (AERB) shall be followed.

c) The 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.

d) The contractor shall generate the Format No: HSE-8 "Permit for radiation work" before start of work.

e) In 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.

3.3.13 Explosives/Blasting operations

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a) Blasting operations shall be carried out as per latest Explosive Rules (Indian/ International) with prior permission. The Contractor shall obtain license from Chief Controller of Explosives (CCoE) for collection, transportation, storage of explosives as well as for carrying out blasting operations.

b) The Contractor shall prepare exclusive method statement (in cognizance with statutory requirements)for rock blasting works &diffusing unfired explosives, if any, at project site before carrying out actual task. Nowhere blasting shall be carried out by the Contractor or its agency without the involvement of competent supervisor and licensed blaster.

3.3.14 Demolition/ Dismantling

a) The contractor shall adhere to safe demolishing/ dismantling practices at all stages of work to guard against unsafe working practices.

b) The contractor shall disconnect service lines (power, gas supply, water, etc.)/ make alternate arrangements prior to start of work and restore them, ifrequired as directed by EIL/ Owner at no extra cost.

c) Before carrying out any demolition/dismantling work, the 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 contractor shall depute an experienced engineer for supervision and shall make adequate arrangements for Fire-fighting& First-Aid during the execution of these activities.

d) The 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 Contractor without engaging own supervision / field engineer.

3.3.15 Road Safety

a) The Contractor shall ensure adequately planned road transport safety management system.

b) The vehicles shall be fitted with reverse warning alarms & flashing lights / fog-lights and usage of seat belts shall be ensured.

c) The 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.

d) In case of an alert or emergency, the Contractor must arrange clearance of all the routes, roads, access. The 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. Experienced drivers/operators with valid driving license (LMV/HMV)shall be allowed to drive/operate the vehicles/equipment's. The Contractor shall maintain copy of PUC,RC and Insurance etc. for all the vehicles/equipment's.

e) 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.

f) Hydraulic Mobile Crane or equivalent)shall only be allowed for handling(loading/unloading) the materials at fabrication/ storage yards and in no case shall be allowed to transport the materials over project / plant roads.

g) The Contractor shall not deploy any such mobile machinery / Equipment's, which do not have competent operator and / or experienced banks-man/signal-man. Such machinery/equipment's shall have effective limit-switches, reverse-alarm, front& rear-end lights etc. and shall be maintained in good working order.

h) The 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.

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i) For pipeline jobs, the contractor shall submit a comprehensive plan covering transportation, loading / unloading of pipes, movement of side booms, movement of vehicles on the ROW, etc.

j) Height barrier/Restriction to be provided on both side of the HT lines, if required.

k) Contractor's shall arrange /install visible road signs, diversion boards, caution boards, etc. on project roads for safe movement of men and machinery.

3.3.16 Welfare measures

Contractor shall, at the minimum, ensure the following facilities at work sites:

a) A crèche at site where 10 or more female workers are having children below the age of 6 years.

b) Adequately ventilated / illuminated rooms at labour camps & its hygienic up-keeping.

c) Reasonable canteen facilities at site and in labour camps at appropriate location depending upon site conditions. 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.

d) Adequately lighted & ventilated Rest rooms at site (separate for male workers and female workers).

e) Provision for suitable mobile toilets to be made available by Contractor for remote/scattered job locations.

f) Urinals, Toilets, drinking water, washing facilities, adequate lighting at site and labour camps, commensurate with applicable Laws/ Legislation.

g) The contractor shall ensure the test report of drinking water.

h) The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation/spraying of insecticides at workplace/fabrication yard.

3.3.17 Environment Protection

Contractor shall ensure proper storage and utilization methodology of materials that are detrimental to the environment. Where required, 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 and disposed of safely. In no way, toxic spills shall be allowed to percolate into the ground. The contractor shall not use the empty areas for dumping the wastes.

The contractor shall ensure availability of stack emission test report of DG set. Monitoring of air quality emission of DG stack shall be carried out on yearly basis. However, air quality emission shall be monitored first time on commissioning of DG Set.

Contractor to submit Environmental Aspect Impact Register detailing the list of activities in his scope, the respective environmental impact and the actions taken to minimize the impact. Environmental Aspect Impact Register to be prepared as per Format HSE-18 and to be updated and maintained till job completion. Environmental Aspect Impact Register of the contractor shall be reviewed by EIL/Owner on half-yearly basis.

The contractor shall strive to conserve energy and water wherever feasible.

The contractor shall ensure dust free environment at workplace by sprinkling water on the ground at frequent intervals. The air quality parameters for dust, poisonous gases, toxic releases,

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harmful radiations, etc. shall be checked by the contractor on daily basis and whenever need arises.

The 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 EIL/Owner for approval.

For pipeline jobs, top soil shall be stacked separately while making ROW through fields. This fertile soil shall be placed back on top after backfilling.

For offshore construction barges, arrangements shall be made for safe disposal of human, food & other wastes and applicable laws in this regard shall be followed.

3.3.18 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. 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.

3.3.19 Weather Protection

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 he 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.

3.3.20 Communication

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.

For information to all, typical subjects that should be communicated are: -

Inside the company (Top to down)

a. Quality Policy
b. HSE Policy contents
c. Environment Policy
d. HSE Objectives
e. Safety Cardinal Rules
f. HSE Target – reached or missed
g. Praises & Warnings to personnel for HSE Management
h. Safety Walk Through Reports and safety defects / shortfalls (by management)
i. HSE Audit results
j. Revised Statutory Health & Safety provisions, if any
k. H & S publicity
l. Suggestions

Inside the Company (Bottom to up)

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a. Complaints
b. Compliances on safety defects / shortfalls
c. Suggestions
d. Proposals for changes & improvements
e. HSE Reports (including near-miss reports)

3.3.21 Confined Space Entry

The 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. Contractor 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. All persons must be made aware of the risk associated with Nitrogen &all precautionary measures shall be taken when vessel/sphere/pipelines etc. are being purged with nitrogen.
Rescue arrangement must be readily available at workplace to fulfill requirement of the emergency situation.

3.3.22 Heavy Lifts

a) The contractor shall submit detailed rigging study/ plan for EIL/ Owner approval prior to lifting equipment requiring a crane of approx. 100 MT capacity or more due to constraints of its dimensions, location of foundation height, approach & weight.
b) Contractor shall generate the format no. HSE-15 "Permit for heavy lift/critical erection"
c) 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.
d) Prior to actual lifting activities, 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.
e) The contractor shall, at all times, be responsible for all rigging activities.
f) The 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
g) Adequate safety measures such as positive barricading, usage of appropriate PPEs, permit to work, etc. shall be taken during all heavy or critical lifts.
h) Ground condition should be suitable to sustain the Ground Bearing Load of the Crane with full load condition.
i) 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 contractor shall

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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.

3.3.23 Key Performance Indicators

The 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 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 contractor& closed-out in time.
- Number of Safety Meetings conducted (in-house / with contractors)
- Number of HSE Audits made (internal & external) vis-à-vis non conformances raised
- Number of HSE Awareness / Motivational program conducted by 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 man hours 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

3.3.24 Unsuitable Land Conditions

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 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. 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.

3.3.25 Under Water Inspection

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 arrangement sand shall possess 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.

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3.3.26 Excavation

The Contractor shall obtain permission from competent authorities prior to excavation wherever required.

The 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 Contractor shall start digging manually to locate the exact position of buried utilities & thereafter use mechanical means.

In case of non-availability of sufficient data/drawings, underground services i.e. underground cable/ pipe shall be checked by cable detector/pipe locator by the contractor.

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

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

Avoid vertical wall of less than 2mtrs between two adjacent deep excavated pit/area. Further deep excavation should not be kept open for a longer duration.

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

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

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

The Contractor shall use "stoppers" to prevent over-run of vehicle wheels at the edge of excavated pits / trenches. Vehicles movement should be restricted to minimum three meters away from the excavated pit.

The 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.

3.4 Tool Box Talks (TBT)

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 Job specific TBT is to be conducted by the immediate supervisor of the workers.

The 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 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.

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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.

3.5 Training & Induction Programme

a) 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.
Contractor shall arrange suitable facilities (e.g training room/place, audio visual facilities etc.) for organizing such training on HSE.

b) Contractor shall conduct Safety induction programme on HSE for all his workers and maintain records. Sticker for "Safety Induction" shall be pasted on the safety helmet of the site personnel. The Gate Pass shall be issued only to those workers who successfully qualify the Safety induction programme. Contractor to conduct effective safety induction program at work site by making efforts to arrange Video film/Virtual Reality (VR) technology pertaining to the escape routes, assembly points, risks involved in the event of an emergency etc while imparting safety induction.

c) The Contractor 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 Contractor shall always maintain relevant acknowledgement from visitor on providing him brief information on HSE actions.

d) Contractor shall submit job specific training schedule for approval of EIL/Owner &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

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- 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.

e) Records of the training shall be kept and submitted to EIL/ Owner.

f) The 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 Contractor in its HSE Plan.

g) For offshore and jetty jobs, contractor shall ensure that all personnel deployed have undergone a structured sea survival training including use of lifeboats, basket landing, use of radio communication etc. from an agency acceptable to Owner/EIL.

3.6 ADDITIONAL SAFETY REQUIREMENTS FOR WORKING INSIDE A RUNNING PLANT

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

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

b) The 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) 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 contractors.

e) The 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.

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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 by using fire retardant blanket and in no case shall be allowed to fall on the ground containing oil. Similar care shall be taken during cutting operations. Fire watcher to be deployed to ensure the same.

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) Flame proof electrical distribution board, plug and socket shall be used for electrical appliances.

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

3.7 Self-Assessment and Enhancement

The 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.

3.8 HSE Promotion

The contractor shall encourage his workforce to promote HSE efforts at workplace by way of organizing workshops/seminars/training programs, celebrating HSE awareness weeks &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.

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

a) Contractor shall follow the LOTO/Isolation procedure of owner for all energy source isolations installed/under purview by /of owner i.e. "Brown field"

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

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- 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.

c) Contractor shall ensure that all the sources are locked out and tagged properly before giving clearance to start the job.

d) After the completion of job, contractor shall ensure all tools and tackles are removed and nobody is present in the working area and signing on LOTO log book.

e) Only on confirmation of above the 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.

4.0 DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

4.1 On Award of Contract

The Contractor shall submit a comprehensive Health, Safety and Environmental Plan or programme for approval by EIL/Owner prior to start of work. The Contractor shall participate in the pre-start meeting with EIL/Owner to finalize HSE Plans which shall including the following:

- HSE policy & Objectives
- Job procedure to be followed by the Contractor for construction activities including handling of equipment's, scaffolding, electric installations, etc. describing the risks involved, actions to be taken and methodology for monitoring each activity. Indicative list of procedures is enclosed as Annexure-H
- EIL/Owner review/audit requirement.
- Organization structure along with responsibility and authority, on HSE activities.
- Administrative & disciplinary steps involving implementation of HSE requirements
- Emergency evacuation plan/ procedures for site and labour camps
- Procedures for reporting & investigation of accidents and near misses.
- HSE Inspection
- HSE Training programme at project site
- HSE Awareness program eat project site
- Reference to Rules, Regulations and statutory requirements.
- HIRAC
- Environment Aspect Impact Register
- Legal Register
- HSE documentation viz reporting, analysis & record keeping.

4.2 During Job Execution

Contractor shall implement approved Health, Safety and Environment management plan or programme including but not limited to as brought out under para 3.0. Contractor shall also ensure:

a) to arrange workmen compensation insurance, registration under ESI Act, third party liability insurance, registration under BOCW Act etc., as applicable.

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b) to arrange all HSE permits before start of activities (as applicable), like permits for hot work, working at heights (Refer Format No. HSE-6), confined space (Refer Format No. HSE-7), Radiation Work Permit (Refer Format No. HSE-8), Demolishing/ Dismantling Work Permit (Refer Format No. HSE-9),Permit for erection/modification & dismantling of scaffolding(Refer Format No:HSE-14),Permit for heavy lift/critical erection (Refer Format No:HSE-15) ,Permit for energy Isolation & De-isolation" (HSE-16) ,storage of chemical/explosive materials & its use and implement all precautions mentioned therein. In this regard, requirements of *Oil industry Safety Directorate Standard No.* Std -105 "Work Permit Systems" shall be complied with while working in existing Oil or Gas processing plants. List of the persons involved shall be maintained as annexure to the work permit issued for a particular activity.

c) to submit, timely, the completed checklist on HSE activities in Format No.HSE-1, Monthly HSE report in Format No.HSE-5 (use of web based package (www.eil.co.in/conthse) is compulsory wherever the facility is available else a hard copy is to be submitted), accident/ incident reports, investigation reports etc. as per EIL/Owner requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to EIL/Owner.

d) that his top most executive at site attends all the Safety Committee/HSE meetings arranged by EIL/Owner and carries out safety walk regularly. Only in case of his absence from site that a second senior most person shall be nominated by him, in advance, and communicated to EIL/Owner for performing the above tasks.

e) display at site office and at prominent locations HSE Policy, caution boards, list of hospitals, emergency services available, safety signs like Men at work, Speed Limits, Hazardous Area, various do's & don'ts, etc.

f) provide posters, banners for safe working to promote safety consciousness.

g) identify, assess, analyze & mitigate the construction hazards& incorporate relevant control measures before actually executing site works. (HIRAC = Hazard Identification, Risk Analysis and Control).

h) identify, assess, analyze & mitigate the environmental impact & incorporate relevant control measures through Environmental Aspect Impact Register

i) Identify and comply to all applicable HSE related legal requirements by preparing and maintaining a Legal register.

j) To maintain & monitor the level of legal compliance at site, a committee shall be formed comprising of contractor's RCM as Head and lead representatives as member(s)from HR/Legal, HSE and discipline engineer(s) (Civil, Mechanical, Electrical, Instrumentation) as applicable. Committee shall review the applicable legal requirements during periodical meetings and monitor the compliance status.

k) arrange testing, examination, inspection of own as well as borrowed construction equipment's/ machinery (stationary &mobile) before being used at site and also at periodical interval, through own resources and also by 3rd party competent agencies (as deemed fit in statutes). Records of such test, examination etc. shall be maintained & shall be submitted to EIL/Owner as & when asked for.

l) carryout audits/inspection (internal & external) at his works as well as sub-contractor works as per approved HSE plan/procedure/programme & submit the compliance reports of identified shortfalls for EIL/Owner review.

m) Arranging HSE training for site workmen (of his own &subcontractors) through internal or external faculty at periodical intervals.

n) Assistance& cooperate during HSE audits by EIL/Owner or any other 3rd party and submit compliance report.

o) Generate & submit of HSE records/report as per this specification.

p) Contractor shall arrange minimum 100 lux. illumination level at construction site for night works& record shall be maintained.

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q) Mobile phones shall not be permitted in operational area of the Project Site. However, intrinsically safe mobile phone can be permitted on approval from EIL/Owner. Alternatively, telephone booth(s) may be set up by the contractor after obtaining approval from EIL/Owner. Use of mobile phone shall also be restricted during construction activities such as height work, erection of material, confined space and Pre-commissioning & Commissioning activities at all project sites.

r) The contractor shall assign responsible person as in charge for night works and it shall be informed to owner/EIL.

s) Appraise EIL/Owner on HSE activities at site regularly.

t) Carry-out all dismantling activities safely, with prior approval of EIL/Owner representative.

u) The Contractor shall ensure that "Hot works" and painting works do not continue at the same place/ location at project site for which chance or probability of "fire" incident exists.

4.3 During Short Listing of the Sub-Contractors

The contractor shall review the HSE management system of the sub-contractors in line with the requirements given in this specification. The contractor shall be held responsible for the shortcomings observed in the HSE management system of the sub-contractor(s) during execution of the job.

5.0 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
Daily Safety checklist	HSE-10
Housekeeping Assessment & compliance	HSE-11
Inspection of temporary electrical booth/installation	HSE-12
Inspection for scaffolding	HSE-13
Permit 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
Environmental Aspect Impact Register	HSE-18
HIRAC Register	HSE-19
Checklist for Tower Crane	HSE-20
Crane Inspection Checklist	HSE-21
Hydraulic Mobile Crane Inspection Checklist	HSE-22
Hydraulic Rig Inspection Checklist	HSE-23

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Boom Lift Inspection Checklist	HSE-24
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 by contractor in consultation with EIL/Owner.

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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

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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

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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/ Betadine (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.	Snake –Bite Lancet		1No.
33.	Note Book		1 No.
34.	Splints		4 Nos.
35.	Lock		1 Piece
36.	Life Saving/Emergency/Over-the counter Drugs		As decided at site

Box size: Suitable size first aid box to be used for first aid items

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.

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APPENDIX-C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire Extinguisher → / Fire ↓	Water	Foam	CO_2	Dry Powder	Multi purpose (ABC)
Originated from paper, clothes, wood	✔	✔	can control minor surface fires	can control minor surface fires	✔
Inflammable liquids like alcohol, diesel, petrol, edible oils, bitumen	×	✔	✔	✔	✔
Originated from gases like LPG, CNG, H_2	×	×	✔	✔	✔
Electrical fires	×	×	✔	✔	✔

LEGEND : ✔ : CAN BE USED

× : NOT TO BE USED

Note: Fire extinguishing equipment must be checked atleast once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

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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 Wages Act.

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APPENDIX-E(Sheet 1 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

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 atleast 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/ Equipments 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

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APPENDIX-E: (Sheet 2 of 12)

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 pile-driving 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 equipment's 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.

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APPENDIX-E :(Sheet 3 of 12)

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) REINFOR-CEMENT	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

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APPENDIX-E:(Sheet 4 of 12)

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

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APPENDIX-E:(Sheet 5 of 12)

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 ANDUSAGE	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 equipment's 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)
Anushakti Nagar, Mumbai – 400 094

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APPENDIX-E:(Sheet 6 of 12)

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 30mAELCB 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 un armoured cable directly on ground, wall, roof of trees Maintain atleast 3m distance from HT cables All temporary cables should be laid atleast 750 mm below ground on 100 mm fine sand overlying by brick soling Provide proper sleeves at crossings/ inter-sections 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.

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APPENDIX-E :(Sheet 7 of 12)

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/CO_2/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 30mAELCB. 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.

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APPENDIX-E :(Sheet 8 of 12)

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.

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APPENDIX-E :(Sheet 9 of 12)

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 2 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. Multiple activities at same location to be avoided. .
(K) CONFINED SPACES	Suffocation/ drowning	Unconsciousness, death	Use respiratory devices, if reqd. Avoid overcrowding inside a confined space Provide Exhaust fans for ventilation Do not wear loose clothes, neck ties, etc. Fulfill conditions of the permit

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APPENDIX-E:(Sheet 10 of 12)

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

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			Check for presence of hydrocarbons, O_2 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 equipment's 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.

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APPENDIX-E :(Sheet 11 of 12)

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 equipments 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.

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APPENDIX-E:(Sheet 12 of 12)

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

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(N) STRUC-TURAL 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)PIPELIN E 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. Wedges to be provided below the pipe to prevent spool/pipe roll out. 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 grit sand 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.

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APPENDIX-F

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. Behavioral Safety & Motivation.
7. Housekeeping – Storage / Stacking / Handling of materials / Hydraulic Mobile Crane handling.
8. Occupational Health in Construction sector.
9. Personal Protective Equipment's – 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 / Life-line / Fall arrester / Safety Nets / Floor openings.
18. Hazards in Welding & important safety precautions.
19. Gas Cutting – Hazards & safety measures.
20. Fire prevention & fire protection.

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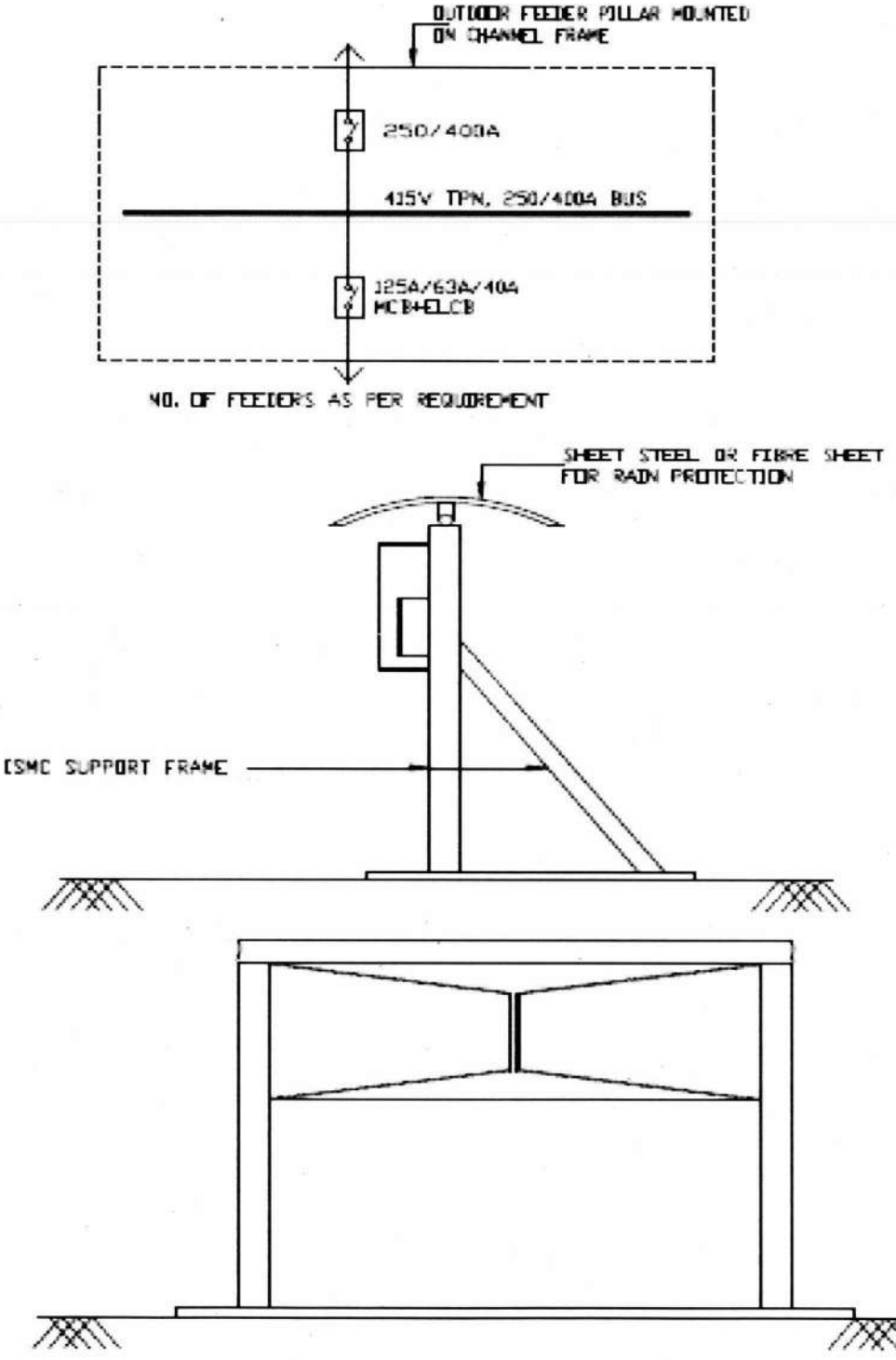
APPENDIX - G

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 OR DIRECTLY 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.

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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 Sub Contractor Management
- HSE Emergency Management
- HSE Incidents Reporting and 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
- Working at Height
- Confined Space Entry
- Permit to Work (including hot works)
- Housekeeping
- Transportation of materials including Manual Handling
- Earthmoving Operations & excavation
- Scaffolding
- Fire Prevention/Protection
- Hazardous Substance handling & Storage
- Personal Protective Equipment

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APPENDIX-I

LIFE SAVING RULES

Bypassing Safety Controls

Obtain authorisation before overriding or disabling safety controls

- I understand & use safety-critical equipment and procedure which apply to my task
- I obtain authorization before:
  - disabling or overriding safety equipment
  - deviating from procedures
  - crossing a barrier

Confined Space

Obtain authorisation before entering a confined space

- I confirm energy sources are isolated
- I confirm the atmosphere has been tested and is monitored
- I check and use my breathing apparatus when required
- I confirm there is an attendant standing by
- I confirm rescue plan is in place
- I obtain authorization to enter

Driving

Follow safe driving rules

- I always wear a seatbelt
- I do not exceed the speed limit, and reduce my speed for road conditions
- I do not use phones or operate devices while driving
- I am fit, rested and fully alert while driving
- I follow journey management requirements

Energy Isolation

Verify isolation and zero energy before work begins

- I have identified all energy sources
- I confirm that hazardous energy sources have been isolated, locked and tagged
- I have checked there is zero energy and tested for residual or stored energy

Hot Work

Controls flammables and ignition sources

- I identify and control ignition sources
- Before starting any hot work:
  - I confirm flammable material has been removed or isolated
  - I obtain authorization
- Before starting hot work in a hazardous are I confirm:
  - a gas test has been completed
  - gas will be monitored continually

Line of Fire

Keep yourself and others out of the line of fire

- I position myself to avoid:
  - moving objects
  - vehicles
  - pressure releases
  - dropped objects
- I establish and obey barriers and exclusion zones
- I take action to secure loose objects and report potentialdropped objects

Safe Mechanical Lifting

Plan lifting operations and control the area

- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load

Work Authorization

Work with a valid permit when required

- I am authorised to perform the work
- I understand the permit
- I have confirmed that hazards are controlled and it is safe to start
- I stop and reassess if conditions change

Work at Height

Protect yourself against a fall when working at height

- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside a protected area

Excavation

Follow safe excavation procedure

- Before starting any excavation:
  - I confirm availability of underground utilities
  - I obtain authorization
  - I take adequate precautions to prevent collapse of soil

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FORMAT NO. : HSE-1 REV 1

(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 : _____ Ccontractor : _____

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 CE, 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).....

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FORMAT NO. : HSE-1 REV 1

(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).....

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FORMAT NO. : HSE-1 REV 1

(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).....

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FORMAT NO. : HSE-1 REV 1

(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).....

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FORMAT NO. : HSE-1 REV 1

(Sheet 5 of 6)

SL. NO.	ITEM	Satisfactory/ Yes	Non satisfactory/ No	Remarks	Action
13.	HANDLING AND STORAGE OF MATERIALS				
a)	Safely stored or stacked				
b)	Passageways clear / free from obstructions				
c)	Fire fighting facility in place				
14.	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.				
15.	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				
16.	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				
17.	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).....

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FORMAT NO. : HSE-1 REV 1

(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				
18.	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				
i)	Adherence to Govt. Guidelines/procedures during epidemic and pandemic (as applicable).				
19.	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).....

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FORMAT NO. : HSE-2 REV 0

(Sheet 1 of 3)

ACCIDENT REPORT

(To be submitted by Contractor after every 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-LTI)	Hospitalized but resumed duty before end of 48 hrsof accident	
Disabling injury (other LTI)	Hospitalized & failed to resume duty within next 48 hrs	
Fatal (LTI):	Death / Expiry	
First Aid case	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: _____

_____

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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 oroils		Vehicle accident	
Other/specify					

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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)
- Nodal Officer HO through RCM (In case of major accident)
- Divisional Head (Constn) through RCM
- Project Manager, EIL, through RCM

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FORMAT NO. : HSE-3 REV 0

(Sheet 1 of 5)

SUPPLEMENTARY ACCIDENT INVESTIGATION REPORT

TICK THE APPROPRIATE ONEAS 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-LTI **)**	Hospitalized but resumed duty before end of 48 hrs of accident.	
Disabling injury (other LTI**)**	Hospitalized & failed to resume duty within next 48 hrs.	
Fatal (LTI)	Death / Expiry	
First Aid case	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: _____

_____

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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	

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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	

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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_____

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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)
Nodal Officer HO through RCM (In case of major accident)
Divisional Head (Constn.) through RCM
Project Manager EIL, through RCM

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FORMAT NO. : HSE-4 REV 0

NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE REPORTPROFORMA

(to be submitted within 24 hours)

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 ☐

Safety Officer
(Signature and Name)
Stamp of Contractor

Site Head / Resident Construction Manager
(Signature and Name)

Note:

- **Near Miss:** Human injury escaped & no damage to property, equipmentor interruption to work.
- **Dangerous Occurrence**: Occurrences as mentioned below shall be considered as "Dangerous occurrences"

a. collapse or failure of lifting appliances or hoist or conveyors or other similar equipment for handling building or construction material or breakage or failure of rope, chain or loose gears; overturning of cranes used in building or other construction work; falling of objects from height;
b. collapse or subsidence of soil, any wall, floor, gallery, roof or any other part of any structure, platform, staging, scaffolding or any means of access including formwork;
c. collapse of transmission tower;
d. fire and explosion causing damage to property at Construction site.
e. spillage or leakage of hazardous substances and damage to their container;
f. Collapse, capsizing, toppling or collision of transport equipment;
g. Leakage or release of harmful toxic gases at the construction site.

To :Owner
:RCM/Site-in-charge EIL (3 copies)

Divisional Head (Const.) through RCM
Project Manager EIL, through RCM
} (Applicable for Dangerous Occurrence only)

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FORMAT NO. : HSE-5 REV 0

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 basedpackage (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 site personnel undergone HSE Induction				
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 Loss Time Injuries (LTI)	Fatalities			
	Other LTI			
8) Number of Non disabling injury (Non-LTI)				
9) Number of First Aid Cases				
10) Number of Near Miss Incidents				
11) Number of Dangerous Occurrences				
12) No. of unsafe acts/ practices detected				
13) No. of disciplinary actions taken against staff/ workmen				
14) Man-days lost due to injury				
15) LTI Free man-hours i.e. LTI free man-hours counted from the Last LTI (enter date: .....)				
16) Frequency Rate (No. of reportable LTI per 10lacs man-hours worked)				
17) Severity Rate (No. of man days lost due to LTI per 10lacs man-hours worked)				
18) No. of activities for which HIRAC Completed				
19) No. of incentives/ awards given				
20) No. of occasions on which penalty imposed by EIL/ Owner				
21) No. of Audits conducted				
22) No. of pending NCs in above Audits				
23) Compensation cases raised with Insurance				
24) Compensation cases resolved and paid to workmen				
25) No of Vehicular Accident cases				
26) No of fire/Explosion cases				

27) Whether workmen compensation policy taken			Yes		No
28) Whether workmen compensation policy is valid			Yes		No
29) Whether workmen registered under ESI Act, as applicable			Yes		No
30) Whether HIRAC Register prepared and updated			Yes		No
31) Whether Environment Aspect Impact Register prepared and updated			Yes		No
32) Whether Legal Register prepared and updated			Yes		No
Remarks, if any					

Date:

Prepared by Safety Officer Approved by Site Head / Resident Construction Manager

(Signature and Name)(Signature and Name)

To: -

- RCM EIL

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FORMAT NO. : HSE-6 REV 1

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 / Equipment's 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 Receiver Verification By Work Permit issuer
Contractor Job Supervisor Contractor Safety Officer Contractor Engineer/RCM

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)

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FORMAT NO. : HSE-7 REV 1

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
			Work Permit Receiver(Contractor Supervisor)	Verification by Contractor Safety officer	Work permit issuer Contractor Engineer/RCM	From	To	Workman

Permit Closure :

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

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

(C) Multi lock ☐ removed ☐ key transferred

☐ Ensured all men have come out ☐ Man-ways barricaded

Remarks, if any:

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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-RCM of contractor)
Name : Designation: Date:

Permit renewal:

Permit extended up to		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:

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FORMAT NO. : HSE-9 REV 1

DEMOLISHING/DISMANTLING WORK PERMIT

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
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 neighboring structures	☐	☐
	First-Aid arrangements made	☐	☐
	Fire fighting arrangements ensured	☐	☐
	Precautions taken for blasting	☐	☐

Work Permit Receiver
(Contractor's Supervisor/Engineer)

Verification by Contractor
(Contractor's Safety Officer)

Permission is granted.

(Work Permit issuer-Client)

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-Client)

CONTRACTOR's NAME

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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	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**

Prepared by
Contractor Site Engineer

Verification By
Contractor Safety Officer

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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,				

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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

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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	Electrical Panel door to be in closed condition and Insulated Mat to be provided in front of panel.		
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

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FORMAT NO. : HSE-13 REV 0

(Sheet 1 of 2)

INSPECTION FOR SCAFFOLDING

Project :
Name of the work :
Name of contractor :

Sr.No. :
Date :
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?				

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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

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FORMAT NO. : HSE-14 REV 1

(sheet 1 of 2)

PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OFSCAFFOLDING

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 favorable 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 ( )

  Work Permit Receiver Verification By Work Permit issuer Contractor Job Supervisor
  Contractor Safety Officer Contractor Engineer/RCM

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FORMAT NO. : HSE-14 REV 1

(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.								

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FORMAT NO. : HSE-15 REV 1

PERMIT FOR HEAVY LIFT/CRITICAL 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?				

Work Permit Receiver Verification By Work Permit issuer Contractor Job Supervisor
Contractor Safety Officer Contractor Engineer/RCM

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FORMAT NO. : HSE-16 REV 1

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 Client/Contractor RCM (as applicable) 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 Client/Contractor RCM (as applicable) Signature: Date: Name: **(*to be included by contractor in consultation with issuing authority)**	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 Client/Contractor RCM (as applicable) Signature: Date: Name: **(*to be included by contractor in consultation with issuing authority)**

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 Client/Contractor RCM (as applicable) 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

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FORMAT NO. : HSE-17 REV 1

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. Name & Signature of Area – In charge/RCM of Contractor (Receiver) Contractor (Issuer)

Verification by Contractor Safety Officer

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FORMAT NO. : HSE-17 REV 1

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 _____	Receiver (site Engr. of Main Contractor)	Issuer(Area In charge/RCM 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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FORMAT NO. : HSE-18 REV 0 **(Sheet 1of 2)**

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	

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(Sheet 2 of 2)

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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FORMAT NO. : HSE-19 REV 0 HIRAC

Risk Identification						Desired Controls & Existing Gaps, If Any		Risk Assessment				Recommended Control Actions To Reduce The Risk Level	Action By	Remarks
SN	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

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FORMAT NO.: **HSE-20 REV 0**

Inspection of Tower Crane

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Serial number plate &SWL marking		
2	Valid TPI Certificate		
3	Valid Insurance		
4	Safe access and egress are provided to the crane operator.		
5	Front glass of Operator cabin		
6	Operator crane cabin is provided with a locking mechanism so as to prevent unauthorised entry.		
7	A safety bar is fitted across the operator's cabin window where there is likelihood of the operator falling through it.		
8	Manufacturer Operating Manual and Maintenance Manual are made available.		
9	An updated Operation and Maintenance log book is available in the operator cabin.		
10	All mounting bolts are in good condition.		
11	Load chart provided		
12	SLI available		
13	Crane hooks have got smooth surface and no dent		
14	Hook-latch / Dog-clamp in hook is effective		
15	Over hoist limit switch		
16	Double body earthing of Tower Crane		
17	Jib angle indicator is provided (For Luffing Jib Tower Crane).		
18	Emergency stop button, which will terminate the operation of the crane engine, is installed in the operator cabin and correctly identified.		
19	Effective braking mechanisms for Hoisting, Derricking, Slewing, Trolley Travelling maintained:		
20	Trolley Travelling limiter to prevent over-travelling of trolley is functional.		
21	Limit switches to prevent over-derricking and over-lowering of jib (For Luffing Jib Tower Crane) is functional.		
22	Slewing limiter to restrict slewing of crane is functional.		
23	Over load Limiter to prevent overloading of crane is functional.		
24	Load Moment Limiter to prevent over-turning moment is functional.		
25	Anti-collision devices are tested to stop the tower crane's operation such that the crane-to-crane interference must be maintained at not less than 3 m.		
26	Condition of boom		
27	Counter weight placement and pins		
28	Winches, pulleys and wire ropes are in good working condition.		
29	Colour coding		
30	Leakage in hydraulic cylinder		

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31	Fire Extinguisher		
32	Tower crane is adequately grounded or protected against lightning.		
33	Wind anemometer is installed and is in good working condition.		
34	Aviation lamp is functional (Reqd. for 30mt and above)		
35	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
36	Safety Induction for Operator		
37	Others		

Signature & Name of Operator:

Signature and name of Job Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-21 REV 0

Crane Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Crane hooks have got smooth surface and no dent		
2	Hook-latch / Dog-clamp in hook is effective		
3	Over hoist limit switch		
4	Over Load Indicator		
5	Over Boom limit switch		
6	Boom angle indicator		
7	Colour coding		
8	Condition of boom		
9	Condition of wire rope		
10	Rope drum / sheaves are in good working condition		
11	Swing break & lock		
12	Swing Alarm		
13	Over hoist break & lock		
14	Boom break & lock (For Telescopic Boom)		
15	Leakage in hydraulic cylinder		
16	Condition of Outrigger (For Tyre Mounted Crane)		
17	Outrigger fully extended Marking (For Tyre Mounted Crane)		
18	Condition of Tyre (For Tyre Mounted Crane)		
19	Wheel chokes are present and are used whenever required (For Tyre mounted)		
20	Battery & lamps		
21	Moving & rotating parts guarded		
22	Load chart provided		
23	Reverse horn (For Tyre Mounted Crane)		
24	Body Condition of crane		
25	Front glass of Operator cabin		
26	Both side Mirror		
27	Number Plate (For Tyre Mounted Crane)		
28	Fire Extinguisher		
29	Horn		
30	Windshield and wipers		
31	Working of light & Indicator		
32	SLI		
33	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		

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34	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
35	TPI Certificate		
36	RC Document (For Tyre Mounted Crane)		
37	Fitness Certificate of Vehicle by authority		
38	Insurance		
39	PUC		
40	HMV License for Operator		
41	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
42	Safety Induction for Operator		
43	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-22 REV 0

Hydraulic Mobile Crane- Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Identification number of Hydraulic Mobile crane boldly scribed in front and rear end of machine		
2	Operator has got adequate document in support of his competency (i.e. HMV driving license, knowledge & training)		
3	Marking of SWL on hook position is clearly visible		
4	Test & examination of Hydraulic Mobile crane by statutory / competent authority is carried out & document is valid		
5	Colour Coding		
6	RC Document		
7	Fitness Certificate of Vehicle by authority		
8	Valid Insurance		
9	Valid PUC		
10	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
11	Safety Induction for Operator		
12	Crane hooks have got smooth surface and no dent		
13	Hook-latch / Dog-clamp in hook is effective		
14	Over hoist limit switch		
15	Over Load Indicator		
16	SLI		
17	Condition of boom		
18	Condition of wire rope		
19	Rope drum / sheaves are in good working condition		
20	Leakage in hydraulic cylinder		
21	Tyre condition		

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22	Battery		
23	Moving & rotating parts guarded		
24	Break		
25	Parking Break		
26	Front horn		
27	Reverse horn		
28	Hydraulic Mobile Crane cabin body and frame of machine is in good order		
29	Both side Mirror		
30	Fire Extinguisher		
31	Front glass pane of the Hydraulic Mobile operator's cabin is clean & clear (i.e. not cracked / damaged / broken)		
32	Windshield and wipers condition		
33	Working of front & back lights, turn Indicators, parking lights & fog lamps		
34	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		
35	Wheel chokes are present and are used whenever required		
36	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
37	Others		

Signature & Name of Operator

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-23 REV 0

Hydraulic Rig Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
2	All switch & mechanical guards are in good condition and properly installed		
3	All Safety Indicator lights work		
4	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
5	Motion alarms are functional		
6	Safety decals are in place and readable		
7	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
8	Braking devices are operating properly		
9	Winches, pulleys and wire ropes are in good working condition.		
10	Function of interlocks and limit switch		
11	The manufacturer's operations manual (in all languages of the operators)		
12	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		
13	Battery Charge		
14	Outriggers in place or functioning. Associated alarms working		
15	Moving & rotating parts guarded		

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16	Load chart provided		
17	Fire Extinguisher		
18	Spark Arrestor, if operated by using fuel(For Running Refinery/ Petrochemical/Chemical Plant)		
19	Serial number plate		
20	SLI		
21	TPI Certificate		
22	Colour Coding		
23	Insurance		
24	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
25	Safety Induction for Operator		
26	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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FORMAT NO. : HSE-24 REV 0

Boom Lift Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Operating and emergency controls are in proper working condition, EMO button or Emergency Stop Device		
2	Functional upper drive control interlock (i.e. foot pedal, spring lock, or two hand controls)		
3	Emergency Lowering function operates properly		
4	Lower operating controls successfully override the upper controls		
5	Both upper and lower controls are adequately protected from inadvertent operation.		
6	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
7	All switch & mechanical guards are in good condition and properly installed		
8	All Safety Indicator lights work		
9	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
10	Motion alarms are functional		
11	Safety decals are in place and readable		
12	Guardrails and anchor points are in place, and in good condition		
13	Work platform & extension slides are clean, dry, & clear of debris		
14	Work platform extension slides in and out freely with safety locking pins in place to lock setting on models with extension platforms.		
15	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
16	Braking devices are operating properly		
17	The manufacturer's operations manual is stored on AWP (in all languages of the operators)		
18	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		

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19	Battery Charge		
20	Outriggers in place or functioning. Associated alarms working		
21	Tyres and wheels are in good condition, with adequate air pressure if pneumatic		
22	Wheel chokes are present and are used whenever required		
23	Moving & rotating parts guarded		
24	Load chart provided		
25	Fire Extinguisher		
26	Spark Arrestor, if operated by using fuel(For Running Refinery/ Petrochemical/Chemical Plant)		
27	Serial number plate with Load capacity		
28	TPI Certificate		
29	Colour Coding		
30	Insurance		
31	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
32	Safety Induction for Operator		
33	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

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SAFETY AND SECURITY REGULATIONS OF BPCL KOCHI REFINERY

KR.HSE.CS.19.PO.CSCW

01-September-2020

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BHARAT PETROLEUM COPORATION LIMITED – KOCHI REFINERY
SAFETY AND SECURITY REGULATIONS

GENERAL

These safety regulations are applicable for performing any work within the Refinery, Jetty facilities, STF facilities, SPM facilities, Water Quarries, Water treatment facilities at Chullichira, Water pump house at Aluva, Cross country pipe lines, or any facilities belonging to BPCL-Kochi Refinery.

In respect of all Labor, directly or indirectly employed in work for the performance of Contractor's part of this Agreement, CONTRACTOR shall at his own expense arrange for all the safety provisions as per Indian Standards Institution, The Petroleum Act 1934, The Factories Act 1948,The Kerala Factories Rules 1957, The Gas Cylinder Rules 2016, The Indian Electricity Act, The Mine Act, OISD Guidelines on Safety (Safety practices during construction – OISD GDN192 and Contractor Safety, OISD GDN 207) and such other Acts, Rules and Regulations as applicable.

OBSERVANCE AND ADHERENCE TO SAFETY REGULATIONS OF BPCL – KR

Contractor shall also observe and abide by all safety regulations of BPCL- KR as given below:

1. CARRYING MATCH BOXES AND LIGHTERS / SMOKING

a) Carrying of match boxes, lighters, non-intrinsic safe mobile phones and torches, cordless phones, wearable electronic devices such as smart watches, e-bands etc within the refinery premises is not permitted.
b) Smoking, consumption of alcohol, intoxicating medicines or narcotics, chewing tobacco or tobacco products, is not permitted inside refinery premises.

2. SAFETY CLEARANCE PROCEDURE

Any work carried out within the refinery premises must be covered by a valid work permit/ Clearance certificate issued by the authorized person of the area involved. All the five types of Work Permits are currently in electronic format and print out of the same will be issued at site upon approval.

i) Cold work permit : A cold work permit shall be obtained from the area in charge prior to commencement of the jobs such as working on process machinery, blinding and de-blinding, opening and closing of flanges, hot bolting, inspection, painting, house-keeping and civil works with excavation up to 1.2 m etc.
ii) Hot work permit : A hot work permit must be obtained for the following type of jobs:
a) Any work involving open flames such as welding, gas cutting, soldering, grinding, burning, heating, use of petromax, etc.
b) Any work involving sparks/ heat generation such as soldering, chipping, grinding, drilling, power wire brushing, gunniting with machine, forging, stress relieving, etc.
c) Shot/ grit blasting
d) Use of gasoline, diesel or electric power driven engines and tools
e) Electrical flash units/flash bulbs for taking photographs
f) Entry of vehicles inside the battery limits of process area, within tank dykes and adjacent to pump houses, API separator and loading gantries
g) Entry of personnel into any confined space like process vessels, storage facility that has been in service, sewers, sumps, etc. as per ROS-018.
h) Vessel box up.
i) Entry into hazardous and potentially hazardous areas like floating roofs of storage tanks.
j) Bringing in explosive and flammable materials within Bharat Petroleum Corporation Limited – Kochi Refinery.
k) Working at height above 3 meters.
l) Earth work excavation beyond 1.2 meters depth as per ROS-019.
m) Radiography as per ROS-023.

All hot work permits shall be followed by a cold work permit /clearance certificate.

iii) Earth work permit: For carrying out excavation or digging anywhere in the refinery, an earth work permit has to be obtained from Electrical section of Power & Utilities department or Estates section of HR department as the case may be. A plot plan showing the location of excavation along with a13 point checklist in line with ROS-019 shall be attached with the permit. Administrative clearance shall be obtained from the

IS dept. and from the instrumentation section of the Maintenance dept. All earth work permit shall be followed by a hot work permit /clearance of cold work permit from the owner dept. as the case may be.

iv) Electrical permit / Electrical Energization and De-energization permit : For carrying out any work connected to Electrical power, which is having the potential to cause personnel injury, equipment damage and Electrical fire, Electrical permit is required. The permit will be issued by authorized person of Electrical section of Power & Utilities department or Estates section of HR department as the case may be to contractor having valid Electrical license. No work shall be performed on electrical equipment unless it is authorized by Engineer-In-Charge.

v) All conditions stipulated in the permit must be strictly complied with.

vi) BPCL-KR reserves the right to cancel a work permit without assigning reasons. When called upon to stop the work by any Refinery personnel, Contractor shall immediately cease to continue the work. Before commencement, fresh work permits must be obtained.

vii) The work permit shall be always available at site. In-case of absence of work permit, the printed and duly signed site reference copy of the e-work permit shall be available at the work site at all times.

3. USE OF REFINERY FACILITIES

Under no condition shall any CONTRACTOR'S personnel tamper with or use any property belonging to the BPCL-KR without obtaining prior sanction from the Engineer in charge/ authorized person of area concerned.

4. EMERGENCIES

The Contractor's personnel shall stop their work and proceed to a safe area in the event an emergency arises in the area they are working like in case of fire, oil spillage, power failure, gas leak, etc. Before recommencement of the work, they should obtain clearance of Engineer in charge/ authorized person of the area involved.

i) Identify the assembly point close to the location of the work.

ii) Location of (Manual Call Points) MCPs, Fire Water Hydrant, fire water monitor close to the area of work are to be known down the line prior to the commencement of the work.

iii) Be familiar with the sequence of fire siren.

5. TEMPORARY FIXTURES

i) Before erecting temporary shelter like sheds or tents anywhere within the BPCL-KR premises, permission from Safety Section must be obtained.

ii) Temporary fixtures like sheds, tents, etc. shall be erected in conformity with our safety standards. Sketch of standard temporary fixture is available with concerned Engineer-in-charge or Safety section.

iii) The list of materials stored in the shed shall be submitted to Safety section along with request for temporary shed.

iv) Name of the contractor, Shed number, validity of the shed and the name of the Engineer in charge shall be displayed at the entrance of the shed.

v) Safety slogan/ safety poster shall be displayed at the entrance of the shed.

vi) Temporary piping, connections and electrical wiring must be laid in such a manner that they may not, cause tripping or hitting hazard.

vii) If electrical supply is provided in the shed/office container

a) Electrical Safety clearance shall be obtained from Electrical Safety Officer for electrical wiring/fitting after obtaining shed approval from Safety section.

b) Suitable fire extinguisher shall be provided

vii) The shed has to be dismantled upon the instruction of Engineer in charge/ authorized person of the area at any point of time or after the completion of the job whichever is earlier.

viii) A communication of having demolished the temporary shed to reach Safety Office immediately.

6. COMPRESSED GAS CYLINDERS

Compressed gas cylinders shall be kept (both full & empty) in upright position. They must be firmly located on the ground on a sturdy stand and the cylinder should be chained to prevent accidental fall. All gas cylinders shall have guard caps and shall be moved from location to another location using trolleys.

Filled and empty cylinders should be stored separately and permission for the storage shall be taken from Safety section. They shall meet the requirements under the Gas cylinder Rules 2016 olour and all the gas cylinders shall be c coded as per IS 4379.1981. Valid test certificate for compressed gas cylinders shall be made available at site for verification by authorized person.

7. HOUSE KEEPING

Good housekeeping must be practiced by the CONTRACTOR'S personnel at all times while within the Plant. During and after completion of the work, they are to ensure that their work area is kept clean and tidy. Separate containers for collection and removal of waste, degradable as well as non-degradable waste should be provided by the contractors at their site and the waste so collected is to be removed to the designated areas. Materials and equipment should be stored in a safe and orderly manner so that they will not block exits to roads, buildings, aisles, passages and approach to firefighting equipment such as fire hydrants, fire hoses and fire extinguishers or areas where emergency safety showers, electrical switch panels, manual call points and switch rooms are located.

8. PERSONAL PROTECTIVE EQUIPMENT (PPE)

All the contract personnel entering Refinery shall wear safety helmet, safety goggle, safety shoes (or the required foot protective equipment like gum boots) and protective clothing such as boiler suit. In addition to the above requirement, any PPE which is required for the safe execution of job shall be provided by the Contractor and the requirement will be provided by the Engineer in charge/ authorized person of the area concerned or Safety section. **The PPEs provided by the contractor to his/her personnel shall meet the requirements as per ROS 17 of BPCL KR and ANSI/EU/IS standards.** However, in certain cases, personal protective equipment maintained by the BPCL-KR will be made available for exigency cases, such equipment shall be returned to the authorities in good condition.

9. CLOTHING

CONTRACTOR'S personnel shall not wear loose clothing while working at site. Usage of free flowing dresses like dhoti, Sari, loose shawl, etc. is not permitted at work site. Those workers who are engaged in hot work or in confined spaces shall wear dress made out of cotton material.

10. CONTRACTORS EQUIPMENT TAGGING AND MONITORING

All the tools and tackles, lifting machines, gas cylinders shall be got certified by the Engineer-In-Charge using the pre-use checklist available and get it tagged from Fire and Safety department. The tools and tackles, lifting machines, gas cylinders and other equipment's shall be inspected by the contract supervisor on a daily basis before the use. Once in every 6 months the equipment's shall be rechecked and get it tagged for its safe use, else the equipment will be considered to be not fit for use. Contractor Name, Equipment Identification No., Technical specification and manufacturer's details shall be printed on the equipment. Penalty as per BPCL KR financial deterrent clauses will be levied against use of such unsafe equipment.

11. UNSAFE PRACTICES

Any unsafe practices or disregard of normal safe working practices by CONTRACTOR'S personnel, when pointed out by BPCL-KR personnel shall be immediately corrected.
BPCL-KR also reserves the right to suspend/ reject any contract personnel involving violation of HSE norms.
Any contract personnel involved in violation of HSE norms will be charged with fine as indicated in the Financial Deterrent norms of BPCL. Financial Deterrent norms are attached as annexure 1 to Safety and Security Regulation of BPCL KR

12. PERSONAL CONDUCT

The following activities / behaviors on the part of Contractor's personnel are strictly forbidden:

a) Fooling on the work, mock fighting or fighting within the BPCL-KR premises.
b) Gambling within the BPCL-KR premises
c) Entering the refinery premises while in possession of any type of weapons.
d) Contractor's personnel shall not pick up quarrel or get into arguments with BPCL-KR/consultants'/ other contractor's personnel/ any other persons or act in any manner subversive of refinery discipline. In case of any misunderstanding, such problems should be referred to the concerned refinery personnel
e) Running in operating areas except in emergencies
f) Entering areas other than work site without permission.

13. MATERIAL HANDLING

13.1 Accidents occur in handling materials because of unsafe working practices such as lifting improperly, carrying too heavy a load and failure to use personnel protective equipment.

Following directives should be adhered to:

a) Before lifting and carrying objects, check and ascertain the weight and size the load. If necessary get help.
b) Survey that the route to be followed is free of obstructions
c) Lift and carry in the proper position. Lift material with your leg and not your back.
d) When two or more men must carry a single object must have good co-ordination.
e) Make sure that object carried does not hit anybody or fall on someone working below.
f) While using mechanical hoists and cranes, test hoists controls and brakes before starting the job.
g) Never carry load over men working nearby. Signal them out of the way.
h) Move the load on signal from one person only.
i) While handing unusually heavy loads like exchangers and drum, use extreme caution and follow work procedure as advised by Engineer-In-Charge or safety section.
j) For loads exceeding 10 T or lift exceeding 10 M, a lifting plan shall be submitted to the Engineer-in-Charge and get it approved prior to starting the work. A copy shall be submitted Safety section.

13.2 Following directives should be adhered to while operating cranes inside the Refinery.

a) Hydra cranes are banned in Refinery operating areas
b) The contractor shall arrange a banks man / signalman with the crane for safe working.
c) The operator/driver shall possess HMV driving license and BPCL-KR driving permit in original and the training certificate issued by the crane manufacturer while working/driving the same.
d) Cranes shall not be used for pulling loads anywhere or transporting materials/loads of any nature along the road.
e) Anchored loads shall not be tried for lifting
f) The cranes shall be in good condition. It shall have valid fitness certificate from statutory/competent authorities for the crane and associated lifting tackles. BPCL-KR has the right to witness tests and examine the cranes whenever required.
g) The contractor shall ensure effectively using the out riggers and shall consider the bearing strength of soil and gradient of the grade level.
h) The speed limit for cranes shall be 15 km per hour within the refinery.
i) The contractor/operator shall ensure load balancing and use of tag line to control unnecessary swing of loads.
j) Contractor shall not allow other people to remain inside the cabin during the course of its travel or during other operation (e.g. travel, lifting, lowering of load etc.)
k) The cranes and all types of vehicles shall be fitted with reverse horns.
l) Contractor shall not bypass safety switches/fittings such as hoist limit switch, boom limit switch, safe load indicator etc.

13.3 The crane, lifting tackles, slings, D shackles, etc. used for the work at site shall comply with the statutory requirement and shall accompany with valid test certificates duly approved by statutory authority. Copy of the test certificate shall be submitted to the Engineer-in-Charge before commencement of site work. Safe work load and copy of the test certificate shall be displayed on the crane. Load chart shall be always available inside the crane.

13.4 Handcart must be of good mechanical construction, sound material and adequate strength and must be declared safe to use by competent and authorized person. Display the name of the contractor who owns it. Record of all the hand carts should be properly maintained which shall include details of purchase, repairs carried out time to time by authorized person. Hand carts must not be used with defective wheels or other body parts. Defective hand carts should be discarded from the system and record of such discarded hand carts should be properly maintained in prescribed manner.

13.5 Over-hanging loads whether on the sides or at the rear of the hand cart or any vehicle is dangerous and particular care must be exercised.

13.6 Trained and experienced riggers only must carry out material handling.

14. OWNER'S EQUIPMENT, MACHINERY AND CONSTRUCTION AIDS

14.1 Use of Owner's Equipment

a) Owner's equipment must not be handled or tampered with by contractor's employees. Owner may grant permission to contractor to operate his equipment, if conditions so require. Contractor shall not use Owner's equipment and tools without obtaining permission from Owner's representative.
b) Contractors shall assume full responsibility for proper care of Owner's equipment and tools which are made available to them for the execution of their work and returning such equipment and tools in good working order. Owner will recover from Contractor(s), the full cost of repairs or replacement of equipment or tools in the event they suffer damage while in Contractor's custody.
c) Contractors are not permitted to make use of the Company's transport.

14.2 Tie-in to Owner's Equipment

Contractor shall not open or tie-in their work into Owner's existing pipeline or equipment including Owner's sewer systems, electric power circuits and other process equipment without specific approval by the Owner's representative.

14.3 Underground Pipes

When doing work in the refinery involving excavations, contractors must not damage or break into otherwise open any underground piping. Extreme care must be exercised in this respect when excavating with power driven equipment. If these are damaged inadvertently, notify the owner's representative immediately.
For all manual digging/excavation jobs, contractor shall ensure that the handle of the tools being used are made of non-conducting material

14.4 Electrical Cables

All underground electrical circuits within Owner's Refinery are identified by a layer of brick and sand above the cable. Under no circumstances shall any contractor remove brick and sand, nor excavate beneath brick and sand without valid permit, nor in any other way expose Owner's electric circuits without specific approval of the Owner's representative. In every case, when a contractor discovers brick and sand in the area of his excavation work, he must immediately stop any further excavating until he has contacted the Owner's representative and secured his specific approval for continuing the job. However care shall be exercised as directed in the excavation permit since cables not identified as above can be found at any place.

14.5 Construction Power

All the electrical installation for construction power to the contractor shall be complied with the guidelines in line with Indian Electricity Act 2003 and Central Electricity Authority (Measures related to Safety and Electric Supply) Regulations, 2010.

a) No electrical installation works shall be carried out except by an electrical contractor licensed by the licensing authority by State Government and under the direct supervision of a person holding a certificate of competency recognized by the State Government (CEA Regulations 29).
b) Earth Leakage Circuit Breaker (ELCB)/Residual Current Circuit Breaker (RCCB) of suitable rating shall be provided in the Electrical Distribution board of contractor's installation as per statutory requirement. The ELCB shall be checked once in a week for short term/shut down jobs, once in a fortnight for long term (3-6 months) job and ELCB/RCCB healthiness shall be recorded by contract supervisor/electrician posted at site.
c) Domestic type power boards, double adapters, 3 pin plug adapters and homemade power boards must not be used. All distribution boards and plug tops shall of industrial type only.
d) The installation of Diesel Generators shall be carried out by licensed electrician/agency based on rating as per the safety and statutory provisions. All such EDGs shall be offered for inspection and clearance by electrical safety section for operation.
e) All hand lamps shall be of 24 volts rating connected using 3 core flexible cables. The third core shall be used for earthing the hand lamp.
f) All Electrical DBs and switchboards shall be standard industrial type, identifiable with contractor's name displayed on it and cleared by electrical safety section for operation.
g) All the portable electrical power tools / equipment's shall be inspected and cleared at site for safe usage.

14.6 Mechanically propelled equipment such as welding machines and air compressors must have markings on its controls so that any person unfamiliar with the equipment will know exactly where and how to stop in the case of emergency. Contractors name shall be displayed on the equipments.

14.7 Gas cutting equipment

a) All gas cutting torches such as oxy-acetylene cutting torch shall be fitted with an approved flash back arrestor at both ends.
b) Two stage regulators with two gauges only must be used.
c) All the hoses used for connection shall be checked for its operability such as its operating pressure. Never connect a low pressure rated hose to a high pressure cylinder/ line.
d) Oxygen gas and other gas hoses should be without any joint. In the event joint becomes essential, only approved connector with jubilee clips must be used.
e) Oxygen must never be used as a substitute for compressed air nor must it be released in a confined space for any reason.
f) Oil or grease must not be allowed to come in contact with oxygen cylinders, regulators or hose.
g) Compressed gas cylinders must never be stored or placed near hot equipment or lines. They must be protected against high temperatures and contact with electrical circuits. They must also be protected from damage by passing or falling objects. When cylinders are not connected for use, safety caps must be in place.
h) Compressed gas cylinders must never be dropped or struck or permitted to strike each other violently. Damage to the cylinder or its valves could result in disastrous jet propulsion of the cylinders and may result in major accidents/fatalities. Compressed gas must be transported with the help of trolleys.
i) Flammable products like Acetylene / Bharat cutting gas should not be used in quantity more than 99 kg in your store or at site.
j) Acetylene / Bharat cutting gas, oxygen cylinders must not be taken inside closed vessels or on the tank roofs under any circumstances, neither may Acetylene / Bharat cutting gas torches connected with the cylinders or generators be left inside any vessel. Torches must always be taken outside the vessel for lighting and when not in use.

15. SCAFFOLDING

Scaffolding provided shall be of good materials and sound construction as per the standards. Scaffolding shall be erected in line with the "safety guideline for scaffold" provided by BPCL-KR. Contractor shall appoint a competent person who shall be a qualified scaffolder as per BS EN 12811 and BS EN 12810 – TG20:08 or OSHA: 29 CFR Part 1926, Subpart L. The scaffolding shall be certified 'fit for use' and "Ready for use scaffold" tag shall be provided at the scaffold by a competent scaffolding certifier and the same shall be verified by the Engineer-In-Charge. Any scaffolding which does not conform to the requirements as per BPCL-KR standard ROS 20 shall be immediately withdrawn from service, dismantled and re-erected such that the requirements are complied with.

16. MOTOR VEHICLE DRIVING

The CONTRACTOR shall ensure that all state traffic regulations are complied with while motor vehicles are being driven inside the refinery premises. Only diesel driven vehicles are permitted to ply inside Refinery. In addition, the following points are also outlined for compliance.

i) SPEED LIMIT
Speed limit within the refinery premises is 25 km/h for jeeps, cars, buses etc and 15 km/hr for trailers, cranes etc. In any case, vehicle drivers should take cognizance of road weather and vehicle condition and adjust their driving accordingly.

ii) PARKING
Park vehicles only in designated areas which is advised by Engineer-In-Charge. Vehicles must be parked in such a manner that they will not move while unattended. As a general rule, vehicles should not be parked at road bends, emergency parking areas, in front of fire equipment sheds and firefighting equipment thereby blocking access to them. Double side parking is prohibited on any road at any time.

iii) SAFETY FITTINGS
Vehicles driven inside the refinery premises should have effective brakes, horns, lights, mufflers, spark arrestor, good tyres, etc. and shall not be aged more than 05 years. All vehicles/ mobile lifting equipment shall be fitted with reverse horn. The exhaust pipe from the engine up to and including the muffler or silencer must not be perforated.

iv) SAFE LOAD / NUMBER OF PASSENGERS
Vehicle shall carry only the number of passengers or weight of load it is authorized to carry as per law. Loads carried in trucks shall be properly secured so that they will not accidentally fall off while vehicle is in motion. Do not travel by sitting on the load.

v) TRACTORS / GOODS VEHICLE
Tractors shall not be used for transporting personnel.

vi) Checking of overhead and side clearance
Vehicle drivers shall always check over-head and side clearance while driving vehicles.

vii) The Contractor shall obtain prior permission to operate vehicles inside the refinery premises.
For deploying vehicles inside BPCL-KR premises, the driver shall have a valid state driving license and they shall also undergo and pass the safety driving test conducted by BPCL – KR.

viii) Carrying persons on the platform of tipper lorry is prohibited.

ix) Standing on goods carrying vehicle is prohibited.

x) All the trucks, tippers shall be properly covered while transferring sand, gravel, Sulphur etc. in order to avoid spillage on roads.

xi) Goods shall not be protruded beyond the platform of the vehicles carrying goods.

xii) All vehicles used inside the Refinery premises by the contractor shall have a valid Registration certificate, fitness certificate, insurance and PUC Certificate.

17. FIRE PROTECTION EQUIPMENT

a) BPCL–KR will provide standby fire protection equipment wherever it is required. Fire & Safety department will inform the details of the operator of such standby fire protection equipment to the contractor's personnel who are working on such jobs. In the event of an accidental fire, it is expected of such personnel to make efforts to extinguish the fire with the standby equipment made available. If the fire situation cannot be controlled, then the CONTRACTOR'S personnel should immediately get in touch with any BPCL – KR' s personnel available. In all cases, accidental fire shall be reported to the Supervisor of the area concerned and Engineer-in-charge

b) Permission must be obtained prior to CONTRACTOR'S personnel drawing water from the refinery fire water loop. After the requirement of water is over, it shall be informed to the Fire station.

c) All efforts should be made by the CONTRACTOR'S personnel to prevent occurrence of any unwanted fire. Diesel driven engines, trucks, tractors, etc. shall not be filled with fuel while the engine is running.

d) Gasoline or naphtha shall not be used as a cleaning agent or solvent.

e) Written permission from Engineer-in-Charge shall be obtained for bringing diesel inside the refinery for the contract work.

18. REPORT ON ACCIDENTS

i) All injuries sustained by the Contractors' personnel and damages to vehicles and property shall be reported to the Engineer-in-Charge as well as to the Safety section during normal working hours and to the Deputy General Manager (Shift Administration) other than in normal working hours. The first information report (FIR) shall be submitted within 4 hours of the incident and a written report within 24 hours as provided in the annexure 2.

ii) Medical treatment for injured contractor's personnel will be entirely the responsibility of the Contractor. However, if required, emergency first aid treatment will be given at refinery's OHC.

iii) If any injured contract personnel is taking treatment from outside hospital, status of the injured personnel and the date of return to duty shall be informed to Engineer-in-Charge and Safety section.

iv) The contractor's personnel shall also report all near miss incidents at the work site to Engineer-in-Charge and Safety section.

v) Contractor must arrange to immediately investigate, properly document and report any injury, accident or near miss involving any of his employees and take follow up action.

vi) According to Factories Act and ESI regulations, any person sustaining any injury in the refinery and absenting himself from work for more than 48 hours, his accident report has to be sent to the respective government authorities. Therefore, the contractor shall inform the Engineer-in-Charge such matter immediately, who will direct him to Safety section for necessary action

19. WARNING NOTICES

Contractor shall provide various sign boards indicating Note, Caution, and Warning related to their work at the working site. These Signboards indicate:-

Note: Highlights on essential element of a procedure to assure corrections.

Caution: Indicates a procedure, practice, etc., which if not strictly observed, could result in damage or destruction of equipment.

Warning: Indicates a procedure, practice, etc., which could result in personal injury or loss of life if not followed correctly.
All are requested to follow the guidelines given in the signboards wherever it is installed.

20. HEALTH, SAFETY AND ENVIRONMENT TRAINING

GENERAL
The contract safety management system in refinery calls for Health, Safety and Environment (HSE) training to all connected with contract works viz., contractors, consultants, contract supervisors, contract workers, etc., who have to work inside the refinery. The contract safety management envisages HSE training as below:

a) Contractors/ Consultants

The Contractors/ Consultants or in the case of companies, the designated overall Manager-in-Charge of the job who have ultimate responsibility for their work in the Refinery shall attend one day HSE training. A HSE number will be issued on completion of the training which is required for the issue of Refinery entry pass.

b) Contract Supervisors

Three days job specific HSE training is compulsory for all contract supervisors. Job specific training includes general safety, confined space safety, working at height safety and electrical safety. At the end of the three days training, an examination is conducted and only those qualified will be issued a HSE number.

c) Contract Workers

All contract workers shall attend one day job specific HSE training and a written examination will be conducted at the end of the training. A HSE number will be issued for the qualified workers..

Training programme would be conducted regularly by HSE department at designated location and the schedule shall be notified well in advance. The HSE number issued will have a validity of two years from the date of qualifying. The HSE number will be different for each category viz. Contractor/Consultant, Contract supervisor and contract worker. For renewal of the HSE number, the contract personnel will have to go through the same process of training, as described above, and will be issued a new HSE number. HSE number will be compulsory for applying for security entry pass for all contract personnel working inside the Refinery.
All contract supervisors and workers who will have to attend the HSE training programme have to be authorized by the concerned departments of BPCL-KR.
The contractor shall prepare a consolidated list of those required to be trained and given entry passes for working within the Refinery in connection with the job awarded to him/them. The list shall be submitted to the Engineer-in-Charge for necessary recommendation for HSE training as above.

21. QUALIFICATION AND EXPERIENCE OF MANPOWER TO BE EMPLOYED

i) If a contractor is employing less than 30 employees, he shall designate one dedicated supervisor as a safety steward. For every 30 persons or more contractor shall appoint one qualified safety steward (Diploma in industrial safety or equivalent qualification such as NEBOSH etc). For more than one safety steward, one of them shall be appointed as Chief safety steward. In addition to above contractor shall also appoint one safety officer for every 100 workers. Safety officer shall have Diploma in Industrial Safety or any equivalent qualification from Government Recognized Institute and minimum 2 years of relevant industry experience. For more than one safety officer, one of them shall be appointed as Chief safety officer. In both the cases, the contractor must specify in writing the name of such persons to the Engineer-in-Charge.

ii) Contractors shall deploy only experienced and qualified supervisors and workmen, who are well conversant with the Safety Regulations in the Refinery.

iii) The minimum qualification requirements of supervisors for field jobs (other than office jobs, grass cutting, housekeeping, general cleaning jobs etc.) shall be:
   a) Diploma in relevant branch of engineering with 2 years of experience.
   b) 10^{th} + ITI in the relevant field with 05 years' experience.

iv) Also supervisors shall have sufficient knowledge of English language to understand Work permit system, work instructions, drawings and they should be able to assimilate the safety training inputs provided by the Refinery and successfully qualify in the tests.
v) Past experience must be for same type of job for which the supervisors would be engaged.
vi) Contractor's skilled workmen like riggers, scaffolders, welders, fitters, crane operators, other specialized equipment operators like hydro-jetting, shot blasting, use of jacks, diamond cutting etc must have sufficient past experience and skills on relevant jobs.
vii) All workmen shall be capable of following instructions and training.

22. REQUIREMENTS DURING SUBMISSION OF TENDER FOR THE PRE-JOB EVALUATION BASED ON SAFETY COMPETENCY

Contractor must submit along with his tender for the pre-job evaluation:-

i. Manpower data
ii. Tools and tackles
iii. Safety records for past 3 years
iv. High risk job executed in the past 3 years
v. Safety accreditations
vi. Safety practices

An evaluation committee will be evaluating the contractor based on their safety competency at the bidding stage and the job execution stage. A declaration as per Annexure 6 shall be made by the contractor and shall be submitted along with the final bill.

Compliance of BPCL – KR Health, Safety and Environment plans

The CONTRACTOR shall comply with the following Health, Safety and Environment Plans and also confirm his / its commitment to the same in the prescribed formats as per annexure 3:
a) Safety Action Plan
b) Housekeeping Plan
c) Environment Control Plan
d) Dust Control Plan and
e) Quality Assurance Plan
Quotation must clearly indicate the number of Supervisors and skilled or unskilled Workers, which will be deployed for the job, from time to time during execution of the Contract.
The above information will be taken into view during tender evaluation.

23. ROLES AND RESPONSIBILITIES OF CONTRACT PERSONNEL

Roles and responsibilities for contractor's management, contractor's supervisor/safety officer and contract worker as stipulated in OISD Guideline 207 are reproduced below. These guidelines shall be strictly followed

Contractor's Management
Duties & responsibilities of the contractor should include the following:

i) To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.
ii) To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval To nominate qualified & trained Safety Engineers / Officers reporting to the Site in charge, for supervision, co-ordination and, liaison for the

implementation of the safety plan. Similar HSE Plan should be implemented at the sub- contractor's or supplier's site /office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.

iii) To arrange suitable facilities in liaison with the owner for drinking water, toilets, lighting, canteen, crèche etc as applicable as per Laws/ Legislation at site and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.

iv) To arrange for fire protection equipment as per the advice of owner.

v) To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the Owner / Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.

vi) To comply with all the security arrangements of owner.

vii) To ensure that the plant and equipment used on-site by him / his employees is correctly registered, controlled and maintained in sound working condition.

viii) To ensure availability of First Aid boxes and First Aid trained attendant.

ix) To ensure that all incidents including near misses are reported to all concerned immediately.

x) The contractor shall provide the following documentation for the pre-job review meeting, as applicable:

a) Documented Safety Plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.
b) CVs of safety stewards and officers
c) A list of portable equipment/tools that the contractor will be bringing on site including the intended service.
d) Verification that portable equipment/tools meet integrity requirements
e) Inspection records for lifting equipment such as cranes and forklifts.
f) Verification that personnel lift equipment is being used as intended by the Manufacturer.
g) Verification of electrical generating equipment integrity by a certified electrician.
h) Verification that pressure equipment meets regulatory standards.
i) Craft skills verification

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub-contractors, if employed, should be approved by the owner. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

Contractor's Supervisor / Safety Officer

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

i) To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.

ii) To ensure that required guards and protective equipment are provided, used, and properly maintained.

iii) To ensure that tools and equipment are properly maintained and tested.

iv) To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.

v) To ensure that the workers understand the work to be done, the hazards that may be encountered, and the proper precautions/procedure for carrying out the work safely.

vi) To take immediate action to correct any violation of safety rules observed or reported.

vii) To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), wherever applicable, and provide necessary mitigation measures.

viii) To ensure inspection and certification of all tools (hand operated as well as mechanically operated) being used. Defective tools shall be immediately removed.

ix) To ensure that appropriate warning signboards or tags are displayed.

x) To ensure that workers have proper training for their job assignments, including use of appropriate PPE and first aid firefighting equipment.

xi) To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.

xii) To ensure that sick and/or injured workers receive appropriate first aid and/or medical attention.

xiii) To report each incident and/or injury in accordance with established procedures and assist in investigation.

xiv) To take necessary action for correction of any unsafe act / condition at the workplace. However, in case the same is outside the limits of authority, it should be reported to Owner's Engineer-in-charge immediately.

xv) To conduct daily inspections to ensure compliance with safety standards, codes, regulations, rules and orders applicable to the work concerned.

xvi) To conduct safety audit at least once in a week. Such documents are to be submitted to Engineer-in-Charge for his review and record and a copy shall be submitted to Safety Section.

xvii) Contractor's safety officer / Safety steward or the supervisor responsible for safety, shall maintain separate safety registers which will include

a. List of activities being carried out at site;
b. Safety Training details of all supervisors and workmen;
c. Safety competitions by the contractor;
d. Records of all accidents, first aid cases and near misses;
e. Records of unsafe acts and unsafe conditions reported by the contract workers;
f. Records of all PPE's being used at site;
g. Records of lifting tools and tackles including slings of all types and their inspection certificates;
h. Records of pressure vessels if any at his site;
i. Fitness certificate of all employees;
j. Tool box records;
k. Safe operating procedures prepared by the Contractor
l. Emergency mock drills conducted by the Contractor;
m. Records of all welding machines, gas cutting sets, compressors, generators, pressure regulators, portable power tools, hand tools and other tools and tackles etc.
n. Records of manpower employed including safety officers and their qualification.;
o. Copies of safety inspection and safety audit reports made by the Contractor safety supervisor as well as by the BPCL Kochi Refinery.
p. Hazard Identification and Risk Assessment shall be carried out for all jobs and shall be documented.

(The contractors whose safety records are not satisfactory will be viewed seriously and necessary action (viz. cancellation of Registration/Contracts) shall be taken against him.)

Contract worker

The duties & responsibilities of the contractor worker should include the following:

i. To perform work safely as per the job requirement and instructions.
ii. To inform all concerned regarding unsafe conditions/acts.
iii. To wear PPE as stipulated and necessary for the job.
iv. To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.
v. To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment

24. SPECIAL SAFETY CONDITIONS

i) All contractor personnel shall follow the safety guidelines of BPCL KR and applicable Refinery Operating Systems (ROS) for the safe execution of work.
ii) All supervisors of the job must be given safety training / demonstration with the help of BPCL-KR F&S section and should acquire knowledge of fire prevention and should be able to make use of fire extinguishers.
iii) No work shall be carried out in refinery premises without proper valid work permits.
iv) Contractor shall comply with all the conditions in the work permit issued by the owner for the specific job.
v) In the event of any contractor's employee spotting a fire in Refinery premises, he shall break the nearest MCP/ dial 101/1922 from the nearest telephone, identify himself and report location of fire. He shall wait until the fire message is repeated by the Fire Alarm Signaler and location confirmed.
vi) Electrical jobs shall be supervised only by licensed electrical supervisor. The electricians to be deployed on the job should have Wireman License issued by statutory authority.
vii) Monthly safety performance report as per annexure 4 shall be maintained by the contractor at their site and every month it shall be submitted to EIC and a copy to Safety section.
viii) Contractor's safety coordinator/ supervisor responsible for safety as the case may be shall conduct at his worksite and document formal safety inspections and audits at least once in a fortnight. Such documents are to be submitted to Engineer-in-Charge for his review and record.
ix) Contractor shall maintain a register to record name of the persons engaged at a particular site on a daily basis.
x) Contractor must ensure highest standard of housekeeping in his area of work on a day-to-day basis. An unsatisfactory housekeeping will earn negative rating, which will attract penal actions like cancellation of registration/contract.
xi) Contractors and supervisors must attend all scheduled safety meetings as would be intimated to him by the Engineer-in-Charge.
xii) Before starting work under any contract, the contractor must ensure that an approved Hazard Identification and Risk Assessment (HIRA), Job Safety Plan/Procedures / field practices as required over and above the safety permit conditions are obtained from Engineer-in-charge and the same shall be followed. He should also ensure that all supervisors and workers involved understand and follow these plan/procedures/field practices.
xiii) Contractor must ensure that in his work site :- (a) Appropriate display boards (size-1.5 x 2 ft) are put displaying signs for site safety, potential hazards and precautions required, and (b) Safety performance scoreboards are provided as per annexure 5.
xiv) Contractor shall put all efforts to deploy minimum manpower to execute the jobs in stipulated time by using modern techniques & mechanization.
xv) All personnel deployed by contractor for the job must have completed HSE training arranged by BPCL-KR HSE department.
xvi) Fitness certificate from BPCL-KR Medical Officer, with validity of 6 months, for the contract workers who are working at a height more than 30 meters using temporary structures, working in confined space and under water jobs shall be submitted to the concerned Engineer-in-Charge and Security department while taking entry pass. Pulmonary Function Test (PFT) shall be conducted for the contract workers who are working in coke handling facilities. And also it shall be endorsed in the entry pass for the workers have the Fitness certificate from BPCL-KR Medical Officer prior to entry.
xvii) Contractor supervisors and workers shall always carry their entry passes with them and it has to be produced on demand.
xviii) Contract personnel shall not use Plant areas, Pump houses, cable cellar rooms, substations, etc. for changing clothes, taking food, resting, etc. The contractors shall provide dedicated office for documentation work and rest/ change room facilities for the workers working under him.
xix) The contractor shall discuss the HSE Policy/ HSE management system with the Safety section prior to commencement of the work.
xx) Periodical medical examination shall be conducted once in 6 months for all workers employed. The contractor shall employ only medically fit personnel for any work and the medical fitness certificate from registered medical practitioner shall be submitted to Engineer-In-Charge before the start of work.

25. CONTRACT SPECIFIC SAFETY REQUIREMENTS

i) Hydro-jetting operation
   a) The operator engaged in hydro-jetting operation shall wear Dyneema Suit
   b) Standby personnel shall be available near the machine while the hydro-jetting operation is going on
   c) The nozzle of the hose shall be fitted with either foot operated or hand operated control mechanism
ii) Hose restraints / whip connectors shall be in place before charging any flexible hoses
iii) Do not store diesel in excess of permitted quantity. Do not fill diesel while the engine is running. Diesel drum shall be always kept on spill containment facility
iv) Torque tensioning methods shall be used for loosening and tightening of nuts and bolts. Hammering shall be avoided to the extent possible. Finger saver to be used wherever manual hammering jobs are involved
v) Lift assist slings (safe lift) shall be used for manually lifting materials

Compliance of BPCL – KR Health, Safety and Environment plans

The CONTRACTOR shall comply with the following Health, Safety and Environment Plans and also confirm his / its commitment to the same in the prescribed formats as per annexure 3:

a) Safety Action Plan
b) Housekeeping Plan
c) Environment Control Plan
d) Dust Control Plan and
e) Quality Assurance Plan

Quotation must clearly indicate the number of Supervisors and skilled or unskilled Workers, which will be deployed for the job, from time to time during execution of the Contract.
The above information will be taken into view during tender evaluation.

26. SPECIAL SAFETY FEATURES FOR THE VEHICLE TO RUN INSIDE REFINERY PREMISES

The contractor shall deploy only Diesel Engine driven vehicles inside refinery with the following special safety features:

a. In the electrical charging system only alternator shall be used and not dynamo.
b. High voltage head lamps with relays shall not be used, that is only direct connected lamp without booster /relay shall be used.
c. PESO approved exhaust flame / spark arrestor shall be provided.
d. Thermal insulation shall be provided on the exhaust manifold.
e. At the air intake, wire gauze type air filter shall be used i.e., paper filter shall not be used.
f. It is compulsory to wear safety belts in all motor vehicles. Hence, necessary safety belts shall be provided in all Taxi Jeeps running inside refinery also, at contractor's cost.

27. USE OF MOBILE PHONE/UHF OR VHF SETS/ WLL PHONES/ DRONES INSIDE REFINERY

Use of mobile phones/UHF or VHF sets/ WLL phones, cameras, smart devices and drones inside Refinery is strictly banned unless approved by Safety section. A permission from Safety section is required to use such facilities inside Refinery.

SECURITY REGULATIONS OF BPCL-KOCHI REFINERY

1. The CONTRACTOR shall record in a register the name and permanent address of the personnel /laborers detailed by him for the work, and the said register shall be kept at the Refinery Contract works entry gate/ Office. The Contractor shall arrange the PCC of all workers engaged by him in the Refinery. Security Procedures for engagement of Migrant workers shall be complied with.
2. The CONTRACTOR shall ensure that his personnel/ laborers display the badges/passes issued by the Security Section on their person while entering/ leaving the refinery premises as well as the work spot concerned.
3. The CONTRACTOR shall collect the said security badges/passes daily and reissue them next day morning to his personnel/ laborers, so that any unauthorized person may not impersonate and force illegal entry at any later stage for which act the responsibility will be entirely that of the CONTRACTOR.
4. The CONTRACTOR shall return all the said badges/passes to the Security Section immediately on termination of the contract work.
5. If the contract period/time. is extended, the CONTRACTOR shall get the badges/passes revalidated from the Security Section.
6. The passes are valid at the specified work sites only and the CONTRACTOR shall ensure that his personnel/laborers will not loiter at other areas.
7. The CONTRACTOR shall ensure that his personnel/ laborers shall enter/leave the refinery premises only through the authorized main gate as indicated.
8. The CONTRACTOR shall ensure that his personnel/ laborers are checked in/ out by his authorized representative for which he shall keep proper records at the Refinery main gate.
9. The contractor shall liable to pay to BPCL KR, the cost of badges, passes at the rate of Rs. 150/- each in case of failure to return the badges/passes and Rs.500/- in case of loss/damage of biometric cards. The contractor shall also render satisfactory explanation, if any passes are found missing /lost after having filed a complaint at the police station and acknowledge / receipt of complaint obtained
10. The CONTRACTOR shall engage that number of workers specified in the PO after having undergone HSSE, cleared ESI/PF, and obtained PCC, in possession of ID Proof etc as applicable. The contract workers shall also be enrolled under the Biometrics system before entry into the Refinery for work.
11. The CONTRACTOR shall ensure that he submits the list of workers working after office hours, on holidays, Sundays to the Security office /CISF before commencement of work.
12. The CONTRACTOR shall not park his contract vehicle in any area of the Refinery except during his routine work.
13. The CONTRACTOR shall, before commencement of the work every day, report to the Operating Shift Supervisor in- Charge of the concerned unit/area the number of personnel/ laborers to be employed by him for the day in the unit/area, and specify the job for which they have been brought into the unit/area.

This information will be furnished in the following format:

From :

Date.....

To : Area/Operating Shift Supervisor
Bharat Petroleum Corporation Limited – KR
Ambalamugal

Dear Sir,

Please be advised that I/we will be engaging today..... (No.) of persons for the following work:

Details of work

Purchase Order No.

Area

Thanking you

Yours faithfully

(to be submitted in duplicate) Sign. of Contractor

NOTE: CONTRACTOR'S PERSONNEL SHALL INCLUDE THE CONTRACTOR HIMSELF WHEREVER APPLICABLE

SECURITY FORMALITIES - FOR CONTRACT WORK IN BPCL – KR

1. The following are the Security formalities / procedures for obtaining security pass.
2. Letter of Request- On award of contract and obtaining the necessary job order/work order from concerned engineer/dept; the contractor should submit a letter/ request as to how many passes he requires to collect from the Security office. The letter/ request is to be addressed to the Chief Security Officer, BPCL-KR. In case of migrant workers the security procedure of the Refinery shall be complied with
3. Passes - Required nos. of Blank passes to be collected from the Office of the Chief Security Officer.
4. Two Passport size photograph to be brought by the contractor/contract workers and the same is to be affixed on the pass.
5. Documentation - Two notebooks to be maintained by the contractor for documentation – one notebook is required for recording all the addresses of contractor/contract workers. All entries of pass and subsequent renewals are to be recorded in this book. The other notebook is required for check in/check out of contractor/ contract workers.
6. OT List - The contractor will have to submit a list of workers working after 5pm on working days, on Holidays and on Sundays. This permit signed by the Sr. manager of the concerned dept. should reach the CSO office before 4 pm on working days and in case of Saturday, Sundays & Holidays the last working day previous to the Holiday/Saturday/Sunday.
7. Loss of pass - In case of loss of pass the contractor has to remit Rs.150/- per pass to the Finance department of BPCL - KR. Unused passes if any may also be returned at the close of the job. For Biometric cards Rs 500/- shall be recovered for damage/ loss of pass
8. Leaving the area of job without a reasonable cause is not permitted.
9. Contractor/Contractor - Supervisor/ Contract - worker should always carry with the pass and show on demand by authority.
10. Check-in/ check-out of the contract workers should be done by the contractor /Supervisor who should accompany the worker to the Security labor gate. In case the worker is not checked out by the Contractor/ Supervisor in time, further entry to the Refinery will be subject to clearance from CSO.
11. HSE Training/ Fire & Safety Training:-- HSE Training / Fire & Safety Training is mandatory. All contractors / contract workers should undergo-this training before commencement of their work. The Training is arranged by the refinery.
12. Security entry passes shall be issued only after having obtained the HSE Card, ESI/PF Clearance & Police Clearance Certificate from the respective police stations residing.
13. Violations of any of the security instructions will entail in cancellation of the pass.

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Annexure 1

BHARAT PETROLEUM CORPORATION LIMITED (BPCL), KOCHI

FINANCIAL DETERRENT FOR VIOLATION OF SAFETY NORMS BY CONTRACTORS (APPLICABLE TO ALL WORKS CARRIED OUT IN THE REFINERY BY CONTRACTORS) REV-2 NOVEMBER -2021

All contractors working inside Refinery have to strictly follow safety norms as per BPCL rules and regulations. Contractors who are violating safety norms will be penalized by the Executing /HSE department. Penalty amount and Reporting Authority for violation / non adherence of various safety norms is given below.

SL NO	VIOLATION OF HSE NORMS	PENALTY AMOUNT	REPORTING AUTHORITY
NON ADHERENCE OF WORK PERMIT CONDITIONS			
1	Working without proper Authorization / Permit (Cold work).	Rs.10,000/- per case & holiday listing of 3 years if repeated.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
2	Working without proper Authorisation/ work Permit (Hot work/Electrical/ Electrical Energisation or De-energisation/ Earth work).	Rs. 20,000/- per case and delisting / holiday listing of 3 years if repeated.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
3	Violation of any of the conditions specified in the permit/JSP/SOP etc.	Rs 5,000/- per permit.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
4	Use of mechanically propelled equipment/engine/ generator set etc. without spark arrestor / with faulty spark arrestor.	Rs. 5,000/- per equipment per occasion.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
5	Failure to remove combustible materials from hot work area.	Rs. 5,000/- Per occasion.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

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6	Welding without earthing connection/ use of damaged electrical connections/ wires/ Unsafe welding/cutting practice.	Rs. 10,000/- Per occasion.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
7	Non-display of name board, warning boards or signs, caution boards, Scaffolding tags, not barricading the site, etc.	Rs 2,000/- per location where job is being executed. Penalty will be repeated if not rectified within 3 days.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
8	Failure to keep work permit/ site reference copy at site. Not attaching JSP/JSA/HIRA or any other required document along with the work permit.	Rs 2,500/- Per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
VIOLATION OBSERVED WHILE WORKING AT HEIGHT			
9	Working at height without safety belt. Arrangement as required i.e. Non-use of double lanyard safety belt/ Not hooking lanyard/ Use of damaged safety belt. Or any other unsafe practice.	Rs 10,000/- per Person per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
10	Throwing up/down any material from height or not making proper provision to bring down material safely from height/Unsafe handling methods/work practice.	Rs 5,000/- per person per Case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
11	Non usage of working platforms/scaffolds where required for safe working at height. substandard/unsafe platform or ladder/Use of Uncertified Scaffolding/ Any non-compliance to ROS 20 or safe guideline provided by BPCL KR.	Rs. 10,000/- per Case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates

NON USE OF PERSONNEL PROTECTIVE EQUIPMENT			
12	For not using Non Respiratory Personal Protective Equipment or using damaged/non-standard PPEs (Helmet, goggles, gloves, safety belts, Boiler suit, Safety Shoes etc.).	Rs.5,000/- per person.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
13	For not using Respiratory - Personal Protective Equipment or using damaged or non-standard respiratory PPEs prescribed in Work permit/job safety plan.(B.A. set/ canister mask/B.A. compressor etc.).	Rs.25,000/- per person.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
VIOLATIONS OBSERVED IN ELECTRICAL WORK			
14	Unauthorized / untrained people entry into SRRs/electrical substations/Electrical rooms/Electrical facility or any other facility where electrical hazard likely to occur.	Rs 10,000 / per person per occasion.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
15	Non-use of ELCB or use of faulty ELCB , using poor joints of cable, using naked wire without top plug into the socket , laying wire/cables on the roads, carrying out electrical jobs by incompetent person/Any unsafe activity on electrical equipment.	Rs 10,000/- per Each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
16	Non deployment and non-availability of Licensed electricians/Competent person for electrical job.	Rs. 10,000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
VIOLATIONS IN EXCAVATION WORK			
17	Unsatisfactory fencing / barricading of excavated areas. Not providing proper shoring / strutting / proper slope. Not keeping the excavated earth at least 1.5M away from excavated area. Any unsafe activity during excavation.	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

VIOLATIONS IN ROAD SAFETY			
18	Driving BPCL or Contractor's vehicle without license from transport authority and safety driving licence issued by BPCL HSE dept. or failure to keep State /BPCL Safety driving licence.	Rs. 5,000/- per case.	Any employees through Head of Dept (F&S)
19	Over speeding of vehicles, rash driving, wrong side parking, wrong side driving, not wearing safety belt or any other road safety violation.	Rs. 5,000/- per case.	Any employees through Head of Dept (F&S)
20	Driving trailer/Crane/fork lift above its speed limit fixed for BPCL-KR Refinery.	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
21	Not having or use of damaged headlights/ indicators/horns/ reverse horns/side mirrors/ guards and other fittings.	Rs. 3,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
22	Failure to display test certificates, SWL and any other required information on hydras/Cranes/forklift and other lifting machines.	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
23	Entry of contractor's vehicle in "No Entry/permitted Area" without proper authorization. .	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
24	Unauthorized parking of contractor's vehicles/cranes inside Refinery. Parking vehicles/cranes beyond the allotted time/date without parking permission after the completion of work.	Rs. 5,000/- per day.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
25	Riding on material handling or transferring vehicles such as Trolleys/ cranes/ mixer truck etc.	Rs. 2,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

26	Sitting or allowing sitting along with the drivers on fork lift /tractor etc. or unsafe action posing danger to life.	Rs. 2,000/- per case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
27	Fuelling Compressor/DG/any other machine or equipment while it is in operation/Fuelling without grounding/ Unsafe act during fuelling.	Rs.5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
28	Vehicle Accident- i.e. overturning, falling in pits, damaging equipment/structure , hitting another vehicle, falling of load/material from vehicle and other vehicle related accidents due to unsafe act.	Rs 20000/- per case plus replacement/ repair charges incurred by KR for company owned material .	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
29	Not covering filled trucks/ tippers while transferring materials such as sand, gravel, sulphur etc. Spillage of material on roads due to unsafe driving or act.	Rs 3,000/- per case plus spillage removal cost incurred for BPCL.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
30	Use of mobile phones/UHF/any other device while driving.	Rs.3,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
31	Unauthorised parking i.e emergency parking area, road bents/curves, narrow roads or which obstructs fire truck movement/ parking vehicles on slopes without stoppers etc.	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
NON DEPLOYMENT OF REQUIRED MANPOWER			
32	Non-deployment of safety supervisor/ safety officer/rigger etc. responsible for safety at work site. Not attending safety meetings by the contractor or his representative/ safety officer.	Rs. 10,000/- per occasion.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

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33	Failure to maintain safety register and records as stipulated in the tender conditions and statutes by Contractor, Safety Supervisor or Supervisor responsible for safety.	Rs. 10,000/- per each case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
34	Failure to have weekly safety site inspection / audit and maintain record (by contractors themselves).	Rs. 10,000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
35	Failure to conduct tool box meeting every day and maintain the records of the same.	Rs. 2,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
36	Failure to submit the monthly Safety performance report or any other safety records/report as demanded before the due date.	Rs- 5000/- per case and Rs-1000/day for further delay	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
VIOLATION OF STATUTORY REQUIREMENT			
37	Acting in contravention to any of the provision mentioned in Factories Act 1948/OSHC act 2020 and/or the rules framed there under including all amendments thereto.	Rs- 5000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
38	Failure to maintain records as per Kerala Factories Rules mentioned below (Which ever applicable) Form No. 8– Report of Examination or test of pressure vessels or plant Form No. 11– Notice of periods of works for adult workers Form No. 12 – Register of adult workers Form No. 25 – Muster roll Form No. 27 – Certificate of fitness for employment in hazardous processes/ dangerous operation	Rs. 10000/- per occasion.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates

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	Form No. 34 – Register of workers employed for work on or near moving machinery Form No. 41 – Report of Examination of Hoists and Lifts Form No. 42 – Certificate of fitness Form for temporary Sheds/Containers constructed by the contractor prescribed by HSE department.		
OCCURRENCES OF INDUSTRIAL ACCIDENTS			
39	Failure to furnish a first information report (FIR) as per prescribed Format within 4 hours of the incident to the EIC and HSE dept. .	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
40	Failure to arrange immediate investigation / evidences / Documents of the incident and furnish within 24 hours to BPCL Engineer-In- Charge and HSE dept.	Rs. 10,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
41	Failure to keep and maintain proper records of all incidents occurred at work site	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
42	Failure to report to BPCL EIC on the - job, medical Centre and area safety officer any injury to his Employees or any near miss or any hazardous/ dangerous incident at work site within the Refinery premises or hiding of any accident or near miss.	Rs. 10,000/- per case..	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
43	Negligence on contractor's part which has resulted in First aid injury. Minor injury.	Rs.5,000/- per case. Rs.10,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates

44	Negligence on contractor's part which has resulted in a Major Injury/Minor fire/Lost Time Injury. Fatality	Rs.10,00,000/- per person. Rs. 15,00,000/- per person.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
45	Negligence on contractors part which has resulted in Bursting of a plant used for containing or supplying steam under pressure greater than atmospheric pressure. Collapse or failure of a crane, derrick, winch, slings , hoist or other appliances used in raising or lowering persons or goods or any part thereof, or the overturning of a crane. Explosion, fire, bursting out, leakage or escape of any molten metal, or hot liquor or gas causing bodily injury to any person or damage to any room or place in which persons are employed. Explosion of any receiver or container. Collapse or subsidence of any floor, gallery, roof, chimney, wall, building or any other structure. Negligence on contractor's part which has resulted in Major Fire.	Rs 1, 00,000/- per case plus repair/replacement charges or any other charges incurred by BPCL.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
46	Negligence on contractor's part which has resulted in Minor Fire. Negligence on contractor's part which has resulted in Major Fire.	Rs-2 Lakh plus repair/replacement charges. Rs- 5 Lakh/case + repair/replacement charges.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
VIOLATION OF LABOUR LAWS			
47	Working beyond statutory limits by contractor's workers.	Rs. 5,000/- per person per day.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
48	Deployment of contractor's employees including supervisors without relevant competency for the safe execution of the job.	Rs. 20,000/- per person per day and holiday listing of contractor for 6 months if repeated.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

49	Deployment of contractor's employees including supervisors without undergoing their medical examination, by the authorized and competent medical practitioner Deployment of workers on high risk jobs like working in confined space, working at height, working under water, etc. without being examined and certified as medically fit.	Rs. 10,000/- per person.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
50	Non subjecting to periodic medical examination after every six months after deployment of workers including supervisors on the job by the certifying medical practitioner.	Rs. 10,000/- per person	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
51	Deployment of child or adolescent	Rs. 10,000/- per person.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
52	Use of untested and uncertified pressure vessel as per Statutes or company requirement.	Rs. 50,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
53	Use of untested and uncertified lifting tools/tackle or similar appliances as per statutes or company requirement.	Rs. 20,000/- per caae.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
VIOLATION IN MATERIAL HANDLING			
54	Improper material handling such as manually handling of heavy material when it requires using mechanical equipment /use of substandard/ defective material handling trolleys/ Hand cart and other unsafe act related to material handling.	Rs. 10.000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates

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55	Utilization of hydra/back-hoe loader for material shifting. Use of crane/back loader or other machinery/vehicle other than intended purpose.	Rs. 25,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
56	Failure to conduct safety checks on equipment/ machine/vehicle /tool or other devices using the inspection checklist and not maintaining the record or not carrying the safety checks properly.	Rs. 5,000/- per item.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
57	Inadequate supervision at work site(absence of supervisor/designated employee as supervisor from site for more than 30 Minutes when work is in progress).	Rs. 10,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
58	Hooking of lifting tools like chain blocks, ropes, web slings or similar appliances to process or utility lines for supporting or lifting.	Rs. 10,000/- per Case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
SAFETY PERFORMANCE DISPLAY BOARD			
59	Safety performance score board not displayed at site office inside Refinery.	Rs. 1,000/-per case per day.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
VIOLATIONS IN USE OF GAS CYLINDERS			
60	Unsafe handling of compressed gas cylinders such as no trolley or jubilee clips or double gauge regulator or flash back arrestor on both gas lines & both ends or damaged hoses or improper storage / handling or cylinders without caps when not in use and other unsafe practices associated with handling and transportation.	Rs. 5,000/- per item per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates

61	Storage of gas cylinders inside non ventilated/ closed containers or storage of gas cylinders without any permission/ failure to segregate the filled and empty gas cylinders or any unsafe storage.	Rs. 5,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
62	Use of domestic LPG for cutting purpose.	Rs. 5,000/- per occasion	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
VIOLATIONS DURING RADIOGRAPHY PROCESS			
63	Radiography without authorization/ Non barricading the area/without warning boards or signs during radiography/ Any violation to ROS23 or Radiography safety guideline provided by BPCL KR.	Rs. 10,000/- per occasion	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
64	Non announcement on PA system/ alerting people working in vicinity, before start of Radiography jobs.	Rs. 2,000/- per occasion	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
65	Not Keeping/having Documents regarding Radiography.	Rs. 5,000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
MISCELLANEOUS			
66	Damage to fire hydrant & monitors, fire extinguishers any other BPCL property including non-return of extinguishers/ BA cylinders/ any other BPCL property.	Rs- 5,000/each case and Cost incurred by BPCL for repair/ replacement or purchase	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

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67	Unauthorised usage of any BPCL store/ item/equipment.	Rs. 5,000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
68	Improper /Poor House-keeping.	Rs. 10,000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
69	Removal of grating/cover/lid on any opening in floor or vessel.	Rs. 10,000/- per each case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
70	Use of dangerous/unsafe portable tools /hand tools/machine without safety guard/ dead man switch or its operation by unskilled worker. Or any unsafe act during the usage of such tools or machinery.	Rs. 10,000/- per each case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
71	Horseplay at work site.	Rs.5,000 /- per each case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
72	Shifting of debris/wastes from one location to another without authorization / dumping debris/scraps at Unauthorized place.	Rs. 10000/- per case plus cost incurred for BPCL for removing the material	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
73	Unauthorized usage of mobile phones/Camera /drones in Refinery premises including other places owned by BPCL-KR.	Rs. 25,000/- per each case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates
74	Carrying or use of prohibited material like match box, cigarette, tobacco, lighter and other ignitable materials.	Rs. 10,000/- per case.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P&U/Proj / P&CS/ AS), Section Head Estates

75	Carrying or working under the influence of alcohol or other intoxicating material like drugs, etc…	Rs 10,000/- per case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
76	Abandoning of materials/ facilities belonging to the contractor such as vehicles/sheds/containers/DG and other machines.	Rs 1,00,000/- per case and cost incurred by BPCL for removing/ dismantling.	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
77	Construction of Unauthorised sheds/Containers/ DG sheds inside refinery.	Rs. 5,000/- per case	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
78	Any activity results in environmental impact or damage or threat.	Rs 1,00,000/- per case plus cost incurred for the rectification or reconciliation	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates
79	Any violation not covered above.	To be decided by BPCL	Engineer-in-charge, Officers of F&S, Head of Dept. (F&S/ Mfg/OM&S/Maint./E&C/P& U/Proj / P&CS/ AS), Section Head Estates

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Notes :

1. The above penalties will be applicable for all the contracts jobs carried out inside Refinery and covered by BPCL HSE norms / work permit system.
2. Site Engineers, Operations Officers, Safety Officers will report such violation through their Department Head /Engineer-in-charge (Reporting Authority) to the respective contracting department (CPO KR) for necessary action. Reporting Authority has been indicated against each violation.
3. On advice from Reporting Authority, respective contracting departments shall make the deductions from the next payment due to the contractor.
4. Person will be sent out from the Refinery in case of violations more than 3 times. For annual and other rate contracts POs awarded as part of rate contract shall also be considered for this.
5. In case of frequent penalties for a particular contractor, necessary action such as holiday listing / delisting will be taken.
6. In addition to the safety conditions mentioned in Special safety Conditions attached, contractors are required to adhere to the following additional safety requirement for which penalties are applicable as above for violation of these conditions:
    a. All contractors shall themselves arrange weekly safety site inspection / audit and monthly safety meeting and record should be maintained.
7. Implementation of above financial penalties for violation of HSE norms does not absolve contractors from their responsibilities to take at all times due and proper precautions to avoid injuries and accidents.
8. Contractors shall own the full responsibility for any accident and injury to any of the workers or to any person or persons or property arising due to violation of HSE norms by contractors even though financial penalty is not applied for such violation. Implementation of these financial penalties does not absolve Contractors from any of the responsibility as per General Contract Conditions (Latest Revision), General Terms and Conditions and Special Safety Conditions.
9. Contractors shall follow the safety guidelines and Safe Operating Procedures (SOPs) provided by BPCL KR in addition to Safety and Security Regulations of BPCL KR.

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Annexure 2

BHARAT PETROLEUM CORPORATION LIMITED - KOCHI REFINERY

REPORT OF INCIDENTS BY CONTRACTORS

Date :

Name of the contractor	
Vendor Code	
PO No	
Job/PO Name	
Tele-phone No	
Email ID	
Engineer-In-Charge	
Department	

Details of the incident						
Date and time of the incident						
Exact location of the incident						
No of persons injured						
No of persons killed						
Type of dangerous occurrence (see over leaf)						
Did it involve	a. Explosion		b. Fire		c. Emission of flammable exposure substance	

Brief description of the incident
Analysis of the incident
Root cause of the incident

Recommendation/ suggestions	
1	
2	
3	
4	

	Name and pass no of the person injured			Name and pass no of the person killed	
1			1		
2			2		
3			3		

Name and pass no of the witnesses		
1		
2		

Particulars of the injury		
1	Fatal (time and date of death)	
2	Non-fatal (if serious give extent of injury such as loss of limb/sight and hearing, fracture, permanent impairment, severe burns)	
3	State whether the injured person was disabled for more than 48 hours	
4	Location of the injury (i.e part of body such as right leg, left hand left eye etc)	
5	State what the injured person was doing the time of accident or dangerous occurrence	
6	Hour at which the injured persons started on the day of accident or dangerous occurrence	

(Name and signature of contractor) (Name and signature of Engineer-In-Charge)

Dangerous occurences

a Bursting of a plant used for containing or supplying steam under pressure greater than atmospheric pressure.

b Collapse or failure of a crane, derrick, winch, slings , hoist or other appliances used in raising or lowering persons or goods or any part thereof, or the overturning of a crane.

c Explosion, fire, bursting out, leakage or escape of any molten metal, or hot liquor or gas causing bodily injury to any person or damage to any room or place in which persons are employed.

d Explosion of any receiver or container.

e Collapse or subsidence of any floor, gallery, roof, chimney, wall, building or any other structure.

Annexure 3

SAFETY ACTION PLAN

All supervisors and contract workers shall attend safety course and obtain certification. Only safety trained workers will be deployed by me. All Personal Protective Equipment will be provided by me. We will strictly adhere to BPCL - KR safety rules and regulations. We will follow the e-work permit system of BPCL - KR. While working at height, safety belt will be used. While handling with chemicals proper precaution shall-be taken to avoid spillage or splash on body. Any incident/accident shall be reported to BPCL - KR authorities and documented properly. Any injury to the personnel employed by me for the job will be promptly reported to BPCL - KR medical centre. Fire extinguisher will be provided as specified in the permit. Proper enclosures will be prepared for welding. While entering column/vessel proper care will be taken by providing standby personnel outside. Only safe to use scaffolding will be used. Daily safety briefing will be given to the personnel employed by me. Safety supervisor shall be designated who will monitor safe working. I/We will employ only medically fit employees for the execution of the job.

HOUSEKEEPING PLAN

All equipment will be properly arranged and placed before start of work. A separate bin shall be provided for collecting waste generated by the personnel employed by me. i.e., canteen waste/gloves/cotton waste. All debris generated from plant will be collected and stored in BPCL - KR allocated space. Metallic debris will be carted way to warehouse and accounted for. Unused material will be deposited back to warehouse. Waste insulation material will be taken out of the site immediately. Spillage of oil, if any, will be cleaned immediately. Work area will be kept clean at all times. Contractor shed and surroundings, if allocated any, will be kept clean and no debris will be deposited on road. We will maintain approach way for movement of cranes etc.

ENVIRONMENT CONTROL PLAN

Proper care will be taken at site to avoid any oil leakage/seepage into the ground. In case of leakage while opening flange, the matter will be reported to BPCL - KR authorities. Debris generated like insulation, refractory, concrete etc. will be collected and stored in designated places as directed by BPCL - KR authorities. Welding machines used shall not emit smoke beyond the permissible level. Cleaning of work site will be carried out on a continuous basis. Proper breathing apparatus will be used wherever required.

DUST CONTROL PLAN

Work shall be carried out in a manner such that generation of dust is minimum. Loose dust/dirt debris will be collected in bags and dumped in designated areas. Work area will be barricaded, if required, to prevent dust inhalation. Dust mask will be used in dust prone areas.

QUALITY ASSURANCE PLAN

Welders will be qualified as per BPCL - KR inspection procedure. Only BPCL – KR qualified welders will be engaged for job. Proper electrodes as specified in action report/scope of work by BPCL - KR will only be used. Proper oven arrangement will be made for use of electrodes. All weld fitments will be offered to BPCL - KR. Weld joints wherever required will be offered to radiography. Minimum rejections/rework will be ensured. Condition of welding machine/generator will be excellent. Proper job sequence will be planned and followed. Experienced riggers will be deployed for all rigging jobs. Rigging will be aware of sign codes/ slings, chain blocks to be used. Fitters/fabricators will have relevant experience and able to understand drawings. All activities will be recorded and documented date wise. Grinders will use proper wheels and depending upon the surface conditions. All tools and tackles used will be of reputed make only. Modern and mechanized tools will be used wherever possible.

I/We are committed to all the above plans

Name and signature of the contractor :
PO No. :
PO Name :
Date :

Annexure 4

	BHARAT PETROLEUM CORPORATION LIMITED KOCHI REFINERY				
	CONTRACTORS MONTHLY SAFETY PERFORMANCE REPORT				
	File No.				
Name of the contractor		Vendor code			
PO name		PO No.			
Contract period		Date			
Sl No	Item	Description			
1	Number of supervisors				
2	Number of workers				
3	Number of qualified safety officers/safety stewards				
4	Health monitoring of employees	75%-100%		25%-50%	
		50%-75%		<25%	
5	Supply of quality of PPE	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
6	PPE usage by the workers	75%-100%		25%-50%	
		50%-75%		<25%	
7	Availability of HSE performance score board at site	Yes		No	
8	Availability of HIRA	Yes		No	
9	Standard of facilities provided for workers	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
10	Standard of housekeeping	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
11	Compliance to safety guidelines	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
12	Knowledge of Fire & Safety Protection System	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
13	Compliance of Work Permit System	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
14	Healthiness of Tools & Tackles	Excellent		Average	
		Very good		Satisfactory	

		Good		Poor	
15	Familiarization with Emergency Actions	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
16	Maintenance of safety records/registers	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
		For the month		Cumulative	
17	Total LTI free man hours worked				
18	Total RLTI free man hours worked				
19	No of permits requested during the contract period				
20	No. of Toolbox talk conducted				
21	No. of safety violations				
24	No. of incidents/injuries occurred due to negligence				
25	No. of penalty levied				
26	No. of near-miss reported				
27	No. of safety suggestions given				
28	No. of unsafe condition reported				
29	No. of safety audits conducted				

Contractors safety performance	Excellent		Average	
	Very good		Satisfactory	
	Good		Poor	

_____	_____	_____
_____	_____	_____
(Name and signature of contractor)	(Name and signature of contractor Safety officer	(Name and signature of Engineer In Charge)

- **Lost Time Injury (LTI)** - Any work related injury which results in a person being unfit for work for a period of 24 hours or more immediately following the occurrence of the occupational injury.
- **Near Miss** - An event or chain of events that could have resulted in fatality, injury, illness and / or damage (loss) to assets, the environment, location's reputation or third parties. The situation was avoided or reduced by the circumstances at the time or under slightly different circumstances would have been more serious.
- **Reportable Lost Time Injury (RLTI)** - Any work related injury which results in a person being unfit for work for a period of 48 hours or more immediately following the occurrence of the occupational injury (as per the Indian Factories Act,1948) "The period of 48 hours" includes rest days, weekend days, leave days, public holidays or days after ceasing employment.

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Annexure 5

	BHARAT PETROLEUM CORPORATION LIMITED - KOCHI REFINERY		
	HSE PERFORMANCE SCORE BOARD		
		Month and Year	
		Date	
Name of the contractor			
Vendor code			
PO / Job No.			
PO / Job Name			
Sl No	Description	For the month	Cumulative
1	Manpower		
2	Total man-hours worked		
3	Lost time injury free man-hours		
4	No. of near-miss cases		
5	No. of unsafe acts		
6	No. of unsafe conditions		
7	No. of HSE inspection/audits		
8	No. of HSE awareness and training programmes		
9	First aid injury cases		
10	No. of Lost time injury		
11	No. of mockdrills		
12	Frequency rate		
13	Severity rate		
14	Incident rate		

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Annexure 6

Bharat Petroleum	**BHARAT PETROLEUM CORPORATION LIMITED - KOCHI REFINERY**
	COMPLIANCE TO SAFETY REGULATIONS **(Declaration to be made by contractors and submitted along with bills)**

Date :

Name of the contractor	
Vendor code	
PO No.	
PO Name	
Executing department	
Engineer-In-Charge	
Bill No.	
Bill Period	

1	Maximum number of workers employed on any day during the bill period		7	Number of toolbox talks conducted during the bill period	
2	Number of supervisors employed		8	Number of safety violations charged during the bill period	
3	Number of safety officers/stewards employed		9	Number of personal injury occurred	
4	Number of sheds constructed/retained and shed numbers assigned during the bill period		10	Whether all gas cylinders, pressure vessels, lifting tools and tackles etc having valid test certificates?	
5	Number of safety posters displayed at site during the bill period		11	Whether all safety records are maintained at site?	
6	Number of near-misses reported to Engineer-In-Charge				

We declare that we have complied with the various safety regulations of BPCL Kochi Refinery

_____ _____

Name and Signature of the contractor with seal **Name and Signature of the Engineer-In-Charge**

Staff No of Engineer-In-Charge:

Comments by Engineer-In-Charge

Overall performance rating	**Very good**	
	Good	
	Satisfactory	
	Poor	

Comments

Annexure 7A

Bidder shall mark "Yes/No" towards confirmation to compliance for each point below of the Safety Competency Form and the same shall be submitted without fail along with the unpriced/technical part of their bid. Proof of the same as indicated below shall be submitted along with this declaration

SAFETY COMPETENCY FORM

Sl. No	Competency	Criteria	Competency Measure	Whether complied	Proof to be submitted
1	Manpower	Safety steward (1 for every 30 workers)	Diploma in Industrial safety or NEBOSH or equivalent qualification with min. One year experience.	Yes / No	Declaration with certificate copy
		Safety officer (1 for every 100 workers)	Diploma in Industrial safety or equivalent qualification from Govt. recognized institute with min. two years' experience.	Yes / No	Declaration with certificate copy
		Skilled workers such as scaffolders, welders, electricians, rigger, fitter, line men etc.	Experience - certified workers with min. 2 years of experience in relevant field.	Yes / No	Contractor Declaration
2	Tools and Tackles	All lifting tools and tackles	List of all tools and tackles	Yes / No	List of tools and tackles shall be submitted by the contractor with Equipment type, TPI validity, intended use
			Suitability for the intended work	Yes / No	List of tools and tackles shall be submitted by the contractor with Equipment type, TPI validity, intended use
			Make and age of tools and tackles	Yes / No	List of tools and tackles shall be submitted by the contractor with Equipment type, TPI validity, intended use
			Certified by competent authority	Yes / No	TPI certificate

3	Safety Records	Past Safety Records	Reportable incidents (Absence more than 48 hrs) in the past 3 years. No incident 2 or less more than 2	(Number)	Contractor Declaration
			Fatal accidents in the last 3 years. No fatality. 1 or more	(Number)	Contractor Declaration
			No. of safety violations charged in last 3 years.	(Number)	Contractor Declaration
4	High risk job	High risk jobs executed in last 3 years	Jobs involving working at height more than 30 meters	Yes / No	Work permit copy/ Approved JSP or any other safety plan
			Jobs involving working in confined space	Yes / No	Work permit copy/ Approved JSP or any other safety plan
			Any other critical jobs	Yes / No	Work permit copy/ Approved JSP or any other safety plan
5	Safety Accreditations	Safety Accreditations	ISO 9001	Yes / No	Certificate from accredited bodies
			ISO 14001	Yes / No	Certificate from accredited bodies
			ISO 45001 /OSHAS 18001	Yes / No	Certificate from accredited bodies
			Safety / excellency awards from other accredited institutions	Yes / No	Certificate copy
			Safety award for any employee from any firm during the execution of work	Yes / No	Certificate copy
6	Safety practices	Best safety practices employed at work site	HSE policy	Yes / No	Policy copy
			HSE manual	Yes / No	HSE manual copy
			Specialized safety training for the employees	Yes / No	Training certificate copy

Name of the bidder: Vendor code: Signature and stamp :

Annexure 7B

SAFETY COMPETENCY FORM

1. Name of the contractor
2. Vendor code
3. Date
4. RFQ/Tender No

1. Manpower

1.	Number of workers to be employed			
2	Number of safety stewards to be employed			
3	Number of safety officers to be employed			
Sl No	Name of the safety stewards	Emp./ Pass No	Qualification	Year of experience
1				
2				
3				
4				
5				
Sl No	Name of the safety officers	Emp./ Pass No	Qualification	Year of experience
1				
2				
3				
4				
5				

(Use additional sheets if required)

Note

- Safety stewards – Diploma in industrial safety/NEBOSH/equivalent qualification with min. one year experience
- Safety officers - Diploma in industrial safety /equivalent qualification from Govt. recognized institution with min. two years of experience.
- Copy of the degree and experience certificate shall be attached

Name and Signature of the contractor/Agency/Firm

Sl No	Name of the worker	Emp./pass No	Skill category	Certificate /Welder /Electrical license No.	Year of experience
1					
2					
3					
4					
5					

(Use additional sheets if required)

Note
- Skilled workers such as scaffolders, welders, electricians, rigger, fitter, line men etc. with minimum 2 years' experience.
- Copy of the competency and experience certificate shall be attached

2. Tools & Tackles

Sl No	Type of tool	Intended use	Make	Date of purchase	TPI validity date (If applicable)
1					
2					
3					
4					
5					

(Use additional sheets if required)

Note
- Copy of the TPI certificate shall be attached (If applicable)

3. Safety Records

Sl No	Description	
1	Number of reportable incidents happened in the past 3 years (Absence more than 48 hrs)	
2	Number of fatal incidents happened in the past 3 years	
3	Number of safety violations charged in last 3 years	

Note The bidder shall submit a declaration in his letter head stating the number reportable/fatal accidents that happened for his employees for the last 3 years and number of safety violations charged in last 3 years.

Name and Signature of the contractor/Agency/Firm

4. High risk jobs executed

SL No	Item	Description of job (Location, date of work, purchase order etc. shall be mentioned)
1	Jobs involving working at height more than 30 meters in the past three years	
2	Jobs involving working in confined space / inert atmosphere in the past three years	
3	Any other critical jobs carried out in the past three years	

(Use additional sheets if required)

Note

- Critical jobs are those involving serious immediate safety threats to the workers as well as to the plant operation such as working in inert atmosphere, vessel or column replacement jobs involving large capacity cranes (>400T) etc. Decision regarding Job criticality will be under the discretion of evaluation committee.
- The bidder shall submit the copy of work permit of the job carried out along with the approved Job Safety Analysis prepared by the contractor.

Name and Signature of the contractor/Agency/Firm

5. Safety accreditations

Sl No	Item	Year of Award	Expiry date	Agency
1	ISO 9001			
2	ISO 14001			
3	ISO 45001/OSHAS 18001			

Note
- Copy of the ISO certificate shall be attached

Safety / Excellency awards from other accredited institutions received by the contractor/ firm/agency in past 3 years

Sl No	Description of safety award	Position	Year of award	Award Institution
1				
2				
3				
4				
5				

(Use additional sheets if required)

Note
- The bidder shall submit a copy of safety excellency letter/certificate/award issued by other organizations, institutions etc.

Safety award for any employee from any firm during the execution of work in the past 3 years

Sl No	Name of the employee	Emp./Pass No.	Description of safety award	Year of award	Award Institution
1					
2					
3					
4					
5					

(Use additional sheets if required)

Note
- The bidder shall submit a copy of safety excellency letter/certificate/award or any appreciation letter issued by other organizations, institutions etc.

Name and Signature of the contractor/Agency/Firm

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6. Safety Practices

Sl No	Item	Document no.	Date of preparation
1	HSE policy		
2	HSE manual		

Note
- The bidder shall submit a copy of updated HSE policy for his firm/agency.
- The bidder shall submit a copy of approved HSE manual of his firm.

Specialized safety training for the employees conducted by the contractor/agency/firm

Sl No	Category of training	Training date	Training validity	Training agency	Number of people attended
1					
2					
3					
4					
5					

(Use additional sheets if required)

Note
- Specialized safety training includes confined space entry safety, first aid, trauma care, electrical safety, working at height, radiography etc.
- The bidder shall submit list of persons along with the certificate copy of the concerned training.

Name and Signature of the contractor/Agency/Firm with seal

For office use only

Remarks

Name & Signature

(Executing Dept.)

Name & Signature

(Safety Dept.)

Annexure 8

BHARAT PETROLEUM CORPORATION LIMITED KOCHI REFINERY

CONTRACTORS SAFETY PERFORMANCE REPORT

File No.

Name of the contractor		Vendor code	
PO name		PO No.	
Contract period		Date	

(Please √ which ever applicable)

Sl No	Item	Description			
1	Number of supervisors				
2	Number of workers				
3	Number of qualified safety officers/safety stewards				
4	Health monitoring of employees	75%-100%		25%-50%	
		50%-75%		<25%	
5	Supply of quality of PPE	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
6	PPE usage by the workers	75%-100%		25%-50%	
		50%-75%		<25%	
7	Availability of HSE performance score board at site	Yes		No	
8	Availability of HIRA	Yes		No	
9	Standard of facilities provided for workers	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
10	Standard of housekeeping	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
11	Compliance to safety guidelines	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
12	Knowledge of Fire & Safety Protection System	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
13	Compliance of Work Permit System	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
14	Healthiness of Tools & Tackles	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
15	Familiarization with Emergency Actions	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
16	Maintenance of safety records/registers	Excellent		Average	
		Very good		Satisfactory	
		Good		Poor	
		For the month		Cumulative	
17	Total LTI free man hours worked				
18	No of permits requested during the contract period				
19	No. of Toolbox talk conducted				
20	No. of safety violations				
21	No. of incidents/injuries occurred due to negligence				
24	No. of penalty levied				
25	No. of near-miss reported				
26	No. of safety suggestions given				
27	No. of unsafe condition reported				
28	No. of safety audits conducted				

Contractors safety performance	Excellent		Average		
	Very good		Satisfactory		
	Good		Poor		

Name and signature of contractor

(Name and signature of contractor Safety officer

(Name and signature of Engineer In Charge)

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Bharat Petroleum

energising lives

BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

This Manual is the highest-level document in BPCL's safety management system and describes the corporation's strategic approach to safety management. It is intended to communicate Corporate Safety Management System (CSMS) Minimum Requirements and Expectations. The compliance to Manual is mandatory for all BUs and Locations.

Approved By	**ED, Corporate-HSSE**
Issued By	**GM, Corporate -HSSE**
Document No	**BPCL/CSMS / V.1**
Revision No.	**00**
Effective Date	**01.04.2018**

NOTE: This Manual is property of BPCL (Corporate-HSSE) and any unauthorized use of this Document is prohibited.

Corporate HSSE
Bharat Petroleum Corporation Limited
"A" Installation, Sewree Fort Road, BPCL Complex, Sewri
Mumbai, Maharashtra - 400015

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Date	**Revision Number**	**Change Summary**
01.04.2018	**Release of BPCL/CSMS/ V.1**	**Initial Version**

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FOREWORD

We at BPCL commit to demonstrate highest standards of health and safety performance at our Operating Locations to a level that will be recognized as the best in India and comparable to the highest standards achieved worldwide.

The adoption of this **Corporate Safety Management System (CSMS) Manual** is strategic to the interests of BPCL. It outlines a structured approach necessary for our all operations to manage health and safety risks to As Low as Reasonably Practicable Level (ALARP) level and drive improvement in a consistent and systematic manner across the corporation.

It is emphasised that this manual sets mandatory minimum requirements to be met by all BUs and all their Operating Locations. BUs and Locations shall develop their own Safety Management System. BUs/Locations may adopt additional or stricter requirements suitable to their needs.

This CSMS is intended to a create a value based safety culture by:

- Proactive risks and opportunities management through strategic safety objectives, plans, procedures and good industry practises;
- Integrating the safety management in all our operational activities;
- Prevention of harm to people, asset and environment through robust planning and operations;
- Monitoring of unplanned process safety events which may have adverse consequences;
- Complying with our legal obligations;
- Constant learning, up gradation of skills and continuous improvements in our practices;
- Regular review of our performance with utmost commitment to safety excellence at all levels.

We look forward for your active support in implementing BPCL Corporate Safety Management System for achieving high standards of safety performance in all our operations.

01.04.2018 **N. Manohar Rao**

Mumbai **Executive Director (HSSE)**

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1. Purpose

BPCL's Corporate Safety Management System is a systematic and structured approach to manage the occupational health & safety risks associated with our operations to As Low as Reasonably Practicable (ALARP) level in accordance to our business goals, values and HSE policy. This documents is the highest level document in BPCL's safety management system and describes the corporation's strategic approach to safety management.

Appendix 1 defines operational overview of BPCL.

2. Objectives

The objectives of BPCL Corporate Safety Management System are:

- To define safety administration process;
- To provide a common safety management structure and high level minimum requirements;
- To facilitate clear, consistent and aligned goals, objectives, plans, roles and responsibilities;
- To improve safety measurement and feedback mechanisms;
- To improve participation and mobilization of all levels of the organization.

3. Application

This Corporate Safety Management System applies to all BPCL operations, assets, and facilities, employees, contractors, and other relevant stakeholders.

4. Future Revision

This Corporate Safety Management shall be reviewed and revised, if necessary by Corporate HSEE once in a two year. BPCL-Corporate HSSE shall conduct periodic audit of the BPCL Operating Locations to determine the compliance level against the minimum requirements as specified in this Manual.

5. BPCL Corporate Safety Management System

Safety management in BPCL is structured through a number of documented statements which, in sequence of importance are :

A. **Statement of Safety Commitment and Core Principles:** WHAT BPCL believes in and is committed to; the philosophical cornerstone for the management of safety.

B. **Corporate Safety Policy:** HOW BPCL wants to pursue the Statement of Commitment (i.e., the adopted course and principles of action).

C. **Strategic Safety Objectives** :The key issues for the full implementation of the corporate Safety Policy and achievement of BPCL's Aspiration, including information as to WHEN and WHEREBPCL wants to achieve these.

D. **Life Saving Rules:** The Rules focus on CRITICAL SAFETY BEHAVIOURS everyone must comply, while work with BPCL as the violations may result in fatalities.

E. **Corporate Safety Management System Structure and Elements:** The detailed Eight Elements Based BPCL management standards prescribing MINIMUM REQUIREMENTS and expectations to be complied by all group companies.

While developing, and implementing their safety management system, all the Operating Locations shall comply with all applicable Indian laws and regulations, MoPNG requirements, OISD Standards , in addition to BPCL Corporate SMS, Technical Standards and other directives as issued time to time. Corporate HSSE shall verify compliance through periodic assurance audits, which is one of the key element of BPCL Corporate Safety Management System Requirements.

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Note 1: This corporate safety management system (titled as CSMS) prescribes minimum safety management system compliance requirements to be complied by all BU's and their Locations.

The BU/Locations are not required to implement a SMS which is identical to the BPCL CSMS. They may develop their own safety management system (titled as BSMS) to suit their needs and may adopt additional/stricter requirements. However must ensure that this meets, as a minimum, the BPCL CSMS Requirements and Expectations.

The Operating Location's safety management system (titled as LSMS), may comprise a greater level of detail than can be provided from a corporate level. They can develop a standalone SMS documentation or integrated documentation with other management systems.

Note 2: External Certification- BUs and Locations shall take their own decision to pursue external ISO or equivalent management system certifications.

5.1 BPCL Statement of Safety Commitment and Core Principles

At BPCL, we are committed to:

- Pursue the goal of no harm to people, asset and environment which includes the communities;
- Pursue the goal of zero process safety events in our operations by continuous process safety improvements;
- design, operate and maintain our facilities that are in-line with industry health & safety best practices, international standards and applicable legal requirements;
- Establish and maintain a robust safety management system and asset integrity procedures;
- Demonstrate a culture of respect to safety rules and personal accountability for compliance;
- Play a leading role in promoting best practice in petroleum industries;
- Promote a culture in which all employees share a vision of safety excellence;
- Transparency in the public reporting of the corporation’s safety performance.

To achieve, above our core safety principles shall be:

- All incidents can be prevented.
- There is always time to do a job safely.
- All operating exposures can be safeguarded.
- Employee involvement and training are essential.
- Management is committed, visible and accountable.
- Protecting our people, environment and assets is good business.
- Respect one another at all times

We shall drive continuous improvement in our safety performance and exceed the stakeholder’s expectations.

5.2 BPCL Health, Safety and Environment Policy

The BPCL corporate HSE policy is enclosed in **Appendix 2**. Each BU either may adopt the same policy or develop their own policy in consistency with the above policy.

5.3 BPCL Strategic Safety Objectives

BPCL corporate is committed to pursue the following strategic safety objectives:

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BPCL Strategic Safety Objectives

"Committed to Achieve Goal Zero"

"No harm to People, Asset and Environment".

"Design, Operate and Maintain our Assets to minimise risks to a level which is As Low As Reasonably Practicable (ALARP) "

Corporate HSSE Council shall review these strategic objectives once in year at the time of its business planning cycle.

BU and Locations shall establish strategic objectives each year as part of BPCL's business planning process. Refer to Section 5.3 of this Manual "HSE Policy and Strategic Objectives" for more details.

5.4 BPCL Life Saving Rules

All BPCL employees and their business partners shall be responsible for adherence to the following mandatory Life Saving rules, facilitate the creation of a positive safety culture and achieving our goal of "Zero Harm". These rules require absolute compliance, as any violation could result in a fatality or major process safety event. Employees violating life saving rules may be disciplined up to and including termination as per Human Resource Guidelines. It is every employee's responsibility to abide at all times by the Life Saving Rules. These rules are defined at **Appendix-3**.BUs may notify additional Rules suitable to their local needs & risk assessment, if needed.

5.5 BPCL Corporate Safety Management System Structure

BPCL Safety Management System provides this systematic and structured process for continual improvement in our safety performance. BPCL has adopted its safety management system structure based on eight (8) elements (Refer **Figure 1** below):

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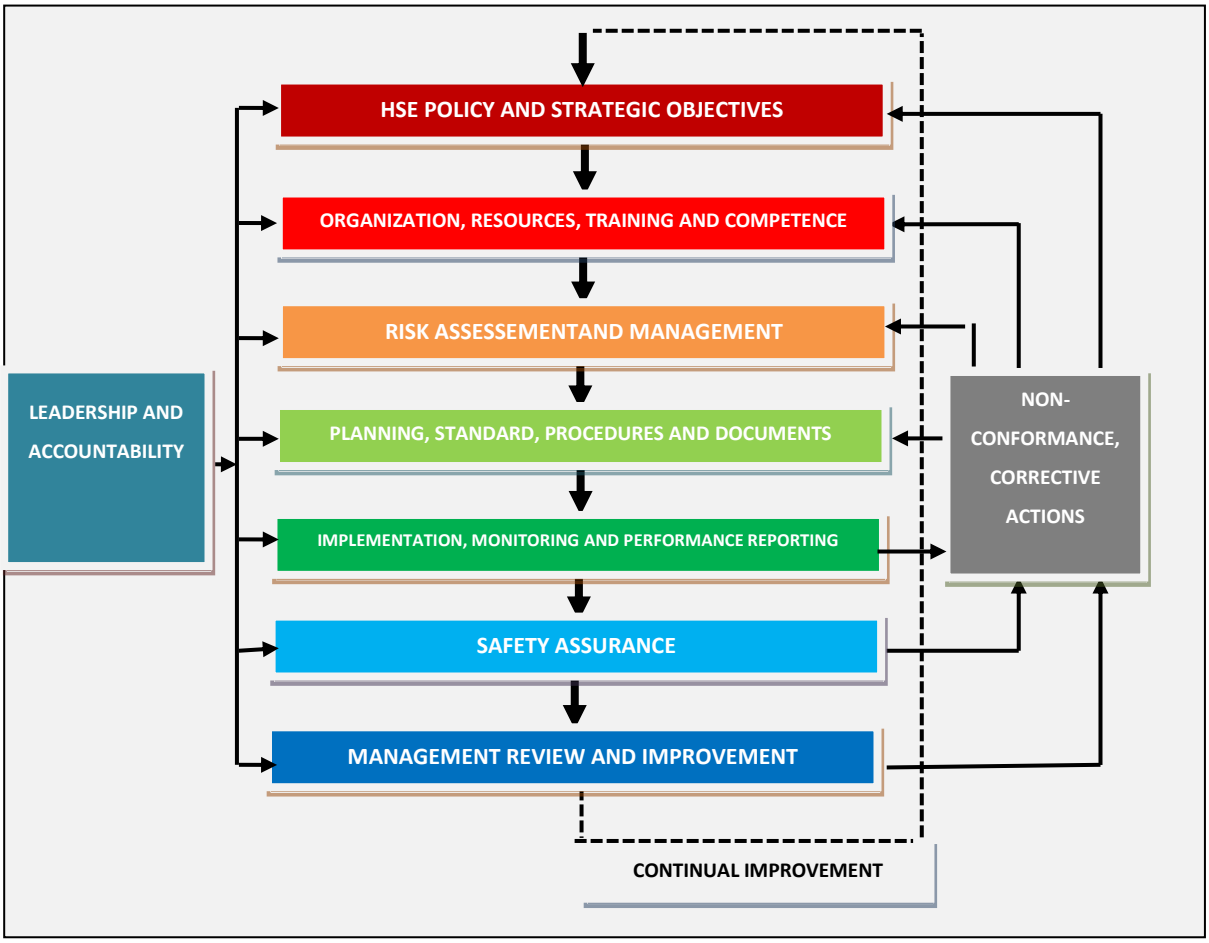

For practical purposes, these eight elements have been further divided into 46 Sub-elements that cover the entire safety management system (Refer Table below). For each Sub-element, the following is provided:

- **Basic Minimum Requirements**: setting out the summarised requirements for each safety management system element/ Sub Element.
- **Reference to Technical Standards**

5.6 BPCL Corporate Safety Management System Element and Sub Elements

Elements	Sub- Elements
1. Leadership and Accountability	1.1 Visibility 1.2 Pro active in Target Setting 1.3 Informed Involvement
2. HSE Policy and Strategic Objectives	2.1 BPCL HSE Policy 2.2 Subordinate Policies/ Rules 2.3 Strategic Objectives 2.4 Dissemination
3. Organization, Resources, Training & Competence	3.1 Organization 3.2 Roles, Responsibilities & Accountabilities 3.3 Resources 3.4 Contractors 3.5 Training 3.6 Competence 3.7 Internal and External Communication

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4. Risk Assessment and Management	4.1 Risk Assessment and Management Framework 4.2 Hazard Identification 4.3 Risk Assessment 4.4 Risk Control
5. Planning, Standards, Procedures & Documents	5.1 Process Safety Information 5.2 Process Hazard Analysis 5.3 Design and Construction 5.4 Project Safety Management Plan 5.5 Operations Integrity 5.6 Periodic Inspection ,Calibration and Testing 6.7 Pre Start up Reviews 5.8 Management of Change 5.9 Control on Critical Drawings and Documents 5.10 Annual Safety Plan 5.11 Standards, Procedures, Work Permit System and work Instructions 5.12 Job Safety Plans 5.13 Emergency Response & Planning 5.14 Documentation 5.15 Fleet Safety
6. Implementation, Monitoring & Performance Reporting	6.1 Implementation 6.2 Non Compliance and Corrective Action 6.3 Compliance to Applicable Laws and OISD Codes 6.4 Behaviour Observation Program 6.5 Performance Monitoring 6.6 Incident Reporting, Investigation and follow up 6.7 Records
7. Safety Assurance	7.1 Audit Programme/Plan 7.2 Corporate Safety Management Audit 7.3 Auditors Competency
8. Management Review and Improvement	8.1 Review Process 8.2 Improvement

Table 1: BPCL Safety Management System Sub-Elements

6. BPCL Corporate Safety Management System Requirements

This section describes the SMS minimum requirements for responsible and systematic safety management.

The documented Expectations aim to provide guidance on how BUs and Locations may develop their own SMS so that they meet the corporate requirements.

For each Element, the following is provided:

Purpose: setting out the summarised requirements for each SMS element.

Requirements: the specific arrangements that must be in place to satisfy the stated purpose.

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6.1 Leadership And Accountability

Purpose

This element provides guidance to all management personnel on their expected roles to demonstrate visibility, pro-activeness and involvement of all personnel as a pre-condition for development of a successful SMS in any BPCL Locations.

Basic Minimum Requirements

6.1.1 Visibility

Management at all levels in the organization shall provide strong and visible leadership by

- Promoting a culture in which all employees share a commitment to safety and their individual responsibility.
- Integrating the safety considerations in all business decisions.
- Actively seeking external & internal views on safety issues to ensure that the HSE policy, objectives, requirements and expectations are communicated to employees and contractors as well.
- Discussing and reviewing with employees and contractors the progress made against specific safety objectives, rules and expectations.
- Constituting Safety Committee & conducting periodic safety reviews for ensuring its suitability, adequacy and effectiveness.

6.1.2 Proactive in Target Setting

BU/Location management shall

- Establish a process / procedure for systematic evaluation of safety hazards and determining control measures based on As Low as Reasonably Practical (ALARP) management of risk.
- Establish a process / procedure for setting pro-active HSSE objectives and improvement plans consistent with its HSE Policy.
- Ensure that necessary manpower and financial resources are identified provided and reviewed periodically, as a part of its business plan for effective implementation of its SMS and control measures.
- Ensure that applicable legal requirements and legislation are identified, documented and complied with.

6.1.3 Informed Involvement

BU/Location management shall

- involve employees in health and safety hazard identification, assessment, communication and development of control measures
- Provide immediate and visible response and involvement, in case of incidents or other abnormal events related to safety.
- Actively participate in safety activities, trainings, recognition), contractor workshops, inspections and audits.

6.2 HSE Policy and Strategic Objectives

Purpose

This SMS element addresses intentions, principles of action and aspirations with respect to health, and safety and the aim of improved safety performance.

Basic Minimum Requirements

6.2.1 HSE Policy

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The BPCL corporate HSE policy is enclosed in **Appendix 2**.

BU top management either shall adopt BPCL corporate HSE policy or shall develop BU specific HSE Policy in accordance with corporate HSE policy directions. This shall also consider the nature, scale of HSE risks of its activities, products and services. This BU HSE policy shall be duly endorsed by BU - Head and shall be reviewed once in three years to ensure its continuing suitability.

The HSE policy shall be communicated to all employees, contractors in relevant local / vernacular languages through distribution of cards, displays and training programmes. The policy shall be displayed at prominent places and be made available to public and other stakeholders.

The entire location shall be notified as a "No Smoking Area" and prohibits working under the influence of Alcohol & banned substances / drugs at its work place including on the duty travel.

6.2.2 Subordinate Policies

BUs shall establish and maintain other Important policies/rules including but not limited to

- No Smoking Policy
- No entry/work under the influence of alcohol or prohibited substances/drugs etc.

6.2.3 Strategic Safety Objectives

Each Location shall establish and maintain documented strategic safety objectives in consultation and in consistency with their BUs business plan, which shall be:

- Relevant to the products, and activities and services undertaken by the Location;
- Consistent with the HSE policy , Statement of Commitment and results of risk assessment and improvement opportunities;
- Consider applicable existing/new legal requirements , technological, business and financial and stakeholders requirements;
- Developed in consultation with relevant employees;
- SMART i.e. Specific, Measurable, Achievable , Realistic and Time-based.
- Location's strategic safety objectives shall be linked to Location's Annual Safety Plan to ensure continuous improvement.
- The strategic objectives may be selected in relevant areas as:
  - Asset integrity issues with safety consequences;
  - Adoption of ISO systems
  - Adoption of Process safety
  - Adoption of Behaviour Based Safety
  - Training etc.

The objectives can be strtegic,tectical or operational.

  - Strategic objectives are aimed at improving the overall safety performance of the organization such as reduction in incident rates, adoption of management system, adoption of good safety practice/standards, culture enhance etc.
  - Tactical Objectives are aimed at technology, engineering,automation improvement related;
  - Operational objectives are aimed at activity improvements.

The Location's top management shall approve these strategic safety objectives and annual safety plan , communicate and periodically review the progress and authorize any amendments, as relevant.

Refer **Appendix 4** a Sample Template for Documenting Strategic Safety Objectives in consistent manner with Corporate and BU Strategic Safety Objectives.

6.2.4 Dissemination

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The HSE Policy and subordinate policies shall be communicated to all employees and contractors in a language and format that is easily understood.

The policies shall be prominently displayed at select work places and offices.

All employees and contractors shall be informed of the relevance of the HSE policy and be aware of their personal role in meeting the requirements of the policies.

All employees and contractors shall be suitably informed of revisions to HSE policy.

Records are kept to demonstrate that employees have received and understood this information.

6.3 Organization, Resources, Training & Competence

Purpose

This SMS element addresses the organisation of people, resources and the competence required for sound health and safety performance.

Basic Minimum Requirements

6.3.1 Organizational Structure, HSSE Administration Organization and Performance Roles

Appendix 5 defines the existing BPCL organizational structure.

Appendix 6 defines the existing BPCL HSSE administration structure.

Appendix 7 defines the BPCL Inter Relationship of HSSE Committees and their functions.

BPCL has constituted a three tiered HSSE administration structure as follows

Tier 1: Corporate HSSE Council
Tier 2: Regional HSSE Committees
Tier 3 : Location HSSE Committees

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BPCL HSSE COMMITTEE STRUCTURE					
Tier	**Name**	**Chairman**	**Secretary**	**Members**	**Frequency**
Tier 1	**Corporate HSSE Council**	Chairman/ Director-Refinery	ED (HSSE)	Head of BUs, HQ HSSE Role holders, Corp HSSE	Quarterly
Interconnected by ED HSSE					
Tier 2	**Regional HSSE Councils** (4 Numbers)	Regional Head SBU Retail	Regional Head LPG	Regional Heads of SBU, HQ HSSE Role, Regional HSSE Role Holder and ED HSSE	Quarterly
Interconnected by HSSE Role Holders					
Tier 3	Unit Level HSSE Committee	Unit Head	Unit HSSE Role Holders	Functional heads	Monthly

Note : BU/ Locations Top management shall define their respective organizational structure to demonstrate a clear two-way communication & channels of decision making in health and safety matters.

6.3.2 Roles and Responsibilities

Top Management at the BU/Locations shall define the roles, responsibilities, authorities and accountabilities of all functions. These shall be documented and communicated to concerned staff to ensure that these are integrated with their respective functions / activities.

Locations shall also designated a senior member of the management team a Process Safety Program Manager (PSPM) to design and implement process safety in time bound manner.

Refer **Appendix 8** for Indicative Roles and Responsibilities at different levels.

6.3.3 Resources

Locations Top management shall ensure that necessary manpower; technical and financial resources are identified, provided and reviewed periodically for effective implementation of its SMS including objectives and control measures.

6.3.4 Contractors

To manage the health and safety risks arising from using contractors, It is recommended that BU/ Locations consider implementation of a 5 Tiered process to integrate safety aspects in overall contractor hiring process**.** It is not necessary that BU/Locations establish and maintain this process as a standalone process but requirements may be integrated in their overall contracting processes and system.

Tier 1- Contractor's Prequalification and Selection

Tier 2- Communicating Contract Specific Safety Requirements in Contract Documents (Tendering / Agreements

Tier 3 - Pre Job Meeting & Contractor's Training

Tier 4 - Execution of the Work & Performance Monitoring

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Tier 5 - Post Contract Evaluation

For every contract, health and safety risk shall be formally assessed prior to invitation to tender. safety pre-qualification, selection and retention criteria shall be established for all work performed by contractors and suppliers as relevant.

For every contract, a person within the location shall be identified as being responsible for all activities in the contracting process and the execution of the contract. Each contractor shall appoint a nodal person for coordination and communication.

For every contract, prior to contract award, contractor safety competence shall be assessed against the risk involved in the job.

An orientation meeting shall be conducted with contractor's representatives prior to start of the work.

Induction training and SOP specific training shall be provided to all contractor's workman prior to start of the work.

The job holders shall provide SOP specific training before start of the work.

A new contractor workman shall not be engaged in job specific work unless he

- has been provided a mentor
- Job specific SOP training is given
- Job is supervised until adequate skills are demonstrated by him.

The Contractor Job Representative shall prepare daily job safety plan to identify specific tasks , their hazards and risks and control measures. This shall be approved by BPCL job owner/ HSSE staff. This is a formal review of all tasks and to be documented.

A regular safety inspection, tool box talk and audit programme shall be in place for all contracts to monitor effective implementation of the SMS and interfaces between contractor and Location management.

Contracts shall specify the reward or penalties for safety performance;

A post contract formal safety review shall be conducted with each contractor and learning's shall be shared.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Contractor's Safety Management for detailed guidance (BPCL/ CSMS/TS /01)**

6.3.5 Training

Locations shall establish a procedure for providing comprehensive and structured training to relevant staff to support appropriate competency levels for managing safety critical activities and safety management system.

Levels of Training

Level 1: Entry Level- Induction/orientation courses and competencies that shall be achieved before being deployed to job/role execution.

Level 2: Role Based-Safety training courses and competencies that shall be achieved before beginning work in specific roles.

Level 3: **Professional Courses**-Recommended i.e. externally recognized or accredited programmes to develop professional skills.

Refer **Appendix 9** for an Indicative list of Level 1 and level 2 training courses (not an exclusive list).

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Training modules

Training modules shall be developed for three categories: executive, supervisory and non-supervisory.

- Executives, who are those who are managers.
- Supervisory are those who supervise the work of at least one other person or a group of persons.
- Non-supervisory staff, who are workman (company or contractors)

Course Structure

BUs shall develop course specific structure that suits their needs:

- Course Title and Code, Aim and Objectives
- Level (i.e. Entry, Role based or Recommended)
- Essential syllabus components
- Duration
- Delivery language(s)
- Target numbers,
- Minimum and maximum delegate numbers
- Course attendance pre-qualifications
- Minimum performance criteria such as qualifying test etc.

Decisions on content, delivery, duration, assurance, competency criteria etc. shall be agreed within the Location safety committee.

The extent and nature of training should ensure achievement of BPCL's HSE Policy and objectives and should meet or exceed standards required by legislation, regulations, and/or other requirements including OISD. Appropriate records of training should be maintained with refresher training scheduled, implemented, and recorded as required, to a defined frequency.

Training may be provided through internal or external formal courses, on-the-job training, and/or through structured development in the workplace, such as coaching or mentoring activities.

Locations shall maintain training records periodic refresher training shall be provided.

6.3.6 Competence

All personnel who perform safety-critical activities shall be competent based on appropriate experience, qualification and/ or training.

Staff competency levels shall be assessed based on above criterion at least once in a year by respective functional Heads and record of this review shall be maintained. In case of shortfalls, the actions shall be identified and addressed in timely manner.

Safety performance criteria shall be included in every line manager's and employee's performance appraisal system.

6.3.7 Internal & External communication

Locations shall establish procedures for

- Internal communication among various levels and functions of the organization
- External Communication including communication with enforcement agencies, public, customers, contractors and visitors to the workplace
- Receiving, documenting, corrective actions, if required based on cause analysis and responding to relevant communication from external interested parties.
- Participation and consultation of staff in SMS

6.4 Risk Assessment and Management

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Purpose

The main objectives for carrying out a risk assessment is to ensure that human health, assets, and the environment are protected, and that the necessary resources are allocated in a prioritised and defensible manner to ensure that any unacceptable risks identified will be reduced to acceptable levels.

Basic Minimum Requirements

6.4.1 Risk Assessment and Management Framework

1. BU/Locations shall establish and implement a documented risk assessment and management program /procedures ensuring that workplace hazards are systematically identified, risks evaluated and prioritized, and action taken to improve OH&S performance where deemed necessary.
2. The **Figure 2** below provides an illustrative view of BPCL Risk Assessment & Management Framework as applicable to all project stages namely

   A. Planning / Design & Engineering (including management of change)
   B. Construction and Commissioning
   C. Operation & Maintenance
   D. Decommissioning

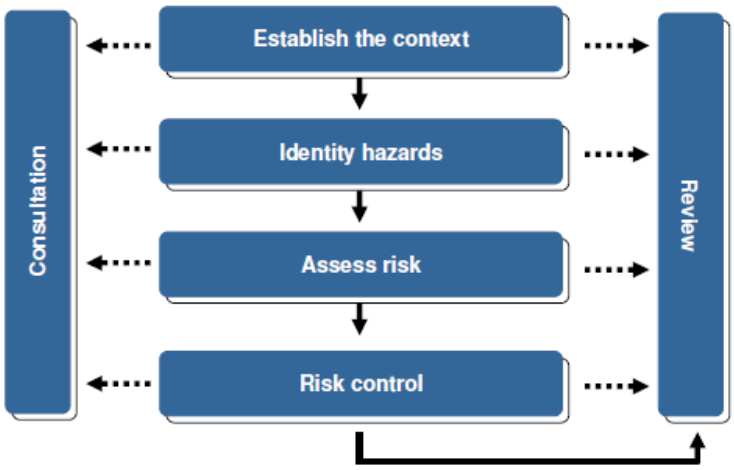

Figure 2 : **BPCL Risk Assessment & Management Framework**

3. BU shall ensure that this program is communicated and adopted by their respective Locations, uniformly.
4. BU shall ensure that risk management is embedded in the Location's safety culture and management system.
5. BU shall designate a custodian for their risk assessment and evaluation programme/procedures.
6. Each Location's shall define a custodian of their risk assessment and evaluation programme/procedures.
7. BU/ Location shall ensure risk assessment is conducted in all project activities design, construction, operation, maintenance and decommissioning stages.
8. BU/ Location shall ensure that adequate Information (occupational and process safety) /data/ drawings etc are available prior to start of the risk assessment;
9. BUs shall define risk analysis/ assessment tools to be used by their Locations as applicable for different stages of the project;

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10. BU shall define competency criteria for personnel, who shall perform risk assessment at the Locations;
11. BU shall define the system for review, approval, maintenance and tracking of risk assessment report/ documents;
12. Be based on consultation with employees, contractors and other relevant stakeholders;

6.4.2 Hazard Identification

1. BU/Locations shall establish a process for hazard identification, which shall consider:
   - routine, non-routine and emergency activities and situations;
   - all persons with access to the workplace (including contractors and visitors) and their activities;
   - situations not controlled by the organization and occurring outside the workplace that can cause injury or ill health to persons in the workplace;
   - situations occurring in the vicinity of the workplace caused by work-related activities under the control of the organization;
   - hazards to workers from work-related activities they perform at a workplace, which is not under direct control of the organization;
   - infrastructure, equipment, materials, substances and the physical conditions of the workplace;
   - hazards that can arise during production, assembly, construction, service delivery or maintenance as a result of product design;
   - actual or proposed changes in the organization, its operations, processes, activities and OH&S management system;
   - the design of work areas, processes, installations, machinery/equipment, operating procedures and work organization, including their adaptation to human capabilities;
   - capabilities and other human factors;
   - changes in knowledge and information on hazards;
   - past incidents, accidents and reports on ill-health.

6.4.3 Risk Assessment

BU/Locations shall establish, implement and maintain a process to:

- assess and prioritize OH&S risk using a uniform Risk Assessment Matrix (5×5) in the BU
- define what is As Low as Reasonable Achievable Risk (ALARP);
- identify opportunities to lower OH&S risk;

6.4.4 Risk Control

BU/Locations shall establish, implement and maintain a process to

- determine controls, considering legal requirements and other requirements and considering the hierarchy of controls to reduce the risk to an acceptable and as low as reasonably practicable (ALARP) level;
- maintain and keep current, documented information on its assessment of OH&S risks, methodology(ies) used, outcomes of the assessment and controls identified.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Risk Assessment and Management for detailed guidance (BPCL/ CSMS/TS /02)**

6.5 Planning, Standards, Procedures and Documents

Purpose

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This element of SMS addresses the planning of work activities where risk reduction measures as selected through the evaluation and risk management process are required to be established and implemented. It includes assets integrity, annual plans, standard/procedures, documentation, emergency response plan etc.

Basic Minimum Requirements

6.5.1 Process Safety Information

The minimum PSI data required for each area is outlined below:

a) Chemical Agents
   i. Toxicity Information
   ii. Permissible Exposure Limits
   iii. Physical Data
   iv. Reactivity Data
   v. Corrosivity Data
   vi. Thermal and Chemical Stability Data
   vii. Hazardous effects of inadvertently mixing different materials (used within the covered process) that could foreseeably occur

b) Technology
   i. Block Flow Diagram
   ii. Simplified Process Diagram
   iii. Process Chemistry
   iv. Maximum Intended Inventory
   v. Safe Upper and Lower Operating Limits (e.g. temperature, pressure, flows, compositions, etc.) and includes an evaluation of the consequences of deviation

c) Equipment
   i. Materials of construction
   ii. Piping and Instrumentation Diagrams (P&IDs)
   iii. Electrical Classification
   iv. Relief System Design and Design Basis
   v. Ventilation System Design
   vi. Design Codes and Standards Employed
   vii. Material and Energy Balances
   viii. Safety Systems

Locations shall maintain a process safety master files in paper or electronic formats for respective process areas as a part of their process safety management.

6.5.2. Process Hazard Analysis

Relevant hazard studies such as Process Hazard Analysis (PHA), Hazard Operability Study(HAZOP), Hazard Identification Diagram (HAZID), Quantitative Risk Assessment (QRA), Safety Integrity Level Assessment(SIL), Environmental Impact Assessment, Activity Based Hazard Identification and Risk Assessment(HIRA) etc. shall be conducted at defined points during the life of all projects. Copies of records, reports etc. generated through hazard studies shall be preserved for the life of the facility.

Locations shall constitute a Process Hazard Analysis team to plan and conduct these studies and integrate findings in Location's safety management system.

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Locations shall also maintain a documented safety management plan consisting of list of critical safety studies required for a project as planning; design & engineering, EPC, operation & maintenance and decommissioning stages.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Project Safety Plan (BPCL/ CSMS/TS/03)**

6.5.3. Design and Construction

Baseline information and results of qualitative and quantitative risk assessments are used as input to installation's design and construction decisions.

Facilities /equipment / pipelines/ tanks/ vessels/ buildings etc. are designed, constructed and commissioned in accordance with suitable internal and external standards, codes and regulations. These also include results of risk analysis studies (HAZOP etc.) and past operating experience and accident history.

There shall be an auditable process of review & approval of all design and subsequent changes by competent staff.

Deviations from the original design intent and/or the existing standards and codes are authorised by senior management in accordance with the Location's management of change procedure.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Safe Design and Operating Philosophies (BPCL/ CSMS/TS/04)**

6.5.4. Project Safety Management Plan

BU shall maintain a documented and formal project safety management process to manage risks associated with the new projects at greenfield locations or modernization/expansion project(s) work within or adjacent to existing installations/plants.

All project contractors shall submit a detailed Project Safety Management Plan in BPCL prescribed template. This shall be a comprehensive document defining safety management system for the project and shall be reviwed/approved by BPCL project owner/ representative, prior to start of the work.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Project Safety Management (BPCL/ CSMS/TS/05).**

6.5.5. Operations Integrity

Establish and maintain procedures to ensure assets, facilities and/or equipment are operated within defined design and operating limits at all times. Communicate this to staff that operate, maintain, inspect and manage them.

Processes are in place to identify and manage critical risk controls/ barriers to prevent a major incident.

Responsibility for managing process operational integrity is clearly defined.

Safety critical equipment, system, activity, task, competency, documents, procedure, organization, plan that is of critical importance to prevent any major accident hazards shall be clearly identified within the Location's safety management system.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Safe Design and Operating Philosophies (BPCL/ CSMS/TS/04)**

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6.5.6. Periodic Inspections, Calibrations & Testing

Locations shall establish documented processes/procedures/checklists/schedules to maintain, replace, test, inspect, calibrate, certify and verify performance of assets, facilities and equipment. These activities are performed at frequencies appropriate to the level of risk, and deviations from specified criteria are managed.

Record of statutory requirements, inspections, maintenance, testing or risk reviews shall be maintained.

Responsibility for managing technical integrity with respect to mechanical, electrical, instrumentation, civil, structural and fire protection maintenance are clearly defined.

Locations shall maintain updated Equipment Master Files (paper or electronic formats) and installation, operation and maintenance manuals.

6.5.7. Pre-Start-up Safety Reviews

For new facilities and existing facilities which have been modified and are about to be handed over for start-up, Locations shall:

- Conduct documented pre-start-up reviews to confirm that construction is in accordance with design, all required verification testing is complete and acceptable, and all recommendations/deviations are closed and approved by the designated technical authority;
- Establish and maintain procedures that ensure that the documentation necessary to support operation, maintenance and inspection is complete prior to facilities start-up;
- Develop and maintain procedures for start-up, operating, maintenance and shut-down with designated authorities defined (e.g. work permit system, hand-over, equipment and process isolations, simultaneous operations).

6.5.8. Management of Change

Locations shall maintain written procedures for the planning and control of all changes, in which the impact of the change shall be assessed to avoid adverse safety consequences. This management of change process shall be applied to cover both permanent and temporary changes / new or modifications to:

- People and organization structure
- Plant, equipment, processes and their controls
- Business Processes
- Standards and procedures

Change control procedures shall document the evaluation and approval process, and the responsibilities and required competencies of those involved.

The procedures shall provide for a comparative analysis and documentation of the safety impact of the proposed change vis a vis the current practise. As a minimum, this shall include a minimum evaluation of risks associated with the proposed change and a mitigation plan to reduce the risks to ALARP.

6.5.9. Control on Critical Drawings and Documents

Locations shall describe the control and authorization processes of any change in the existing Location & equipment layouts/process flow diagrams, piping and Instrument diagrams, process operating limits, standard operating procedures, competency and control systems etc.

Locations shall appoint a custodian for document control on critical drawings, documentation, process safety information and risk assessment studies conducted by the Location.

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6.5.10. Annual Safety Plan

Within its Business Planning Cycle, Locations shall prepare an Annual Safety Management Plans to meet the their continuous improvement objectives. The annual plan shall be linked to the Location's Business Plan and shall comprise:

- Strategic Objective
- Scheduled actions and responsibilities
- Key Performance Indicator
- Time schedule
- Reference standards, if any.
- Applicable legal requirement, if any

Plans revisions, are subject to approval at an appropriate level of authority.

The progress shall be reviewed by Location's safety committee.

6.5.11. Standards, Procedures, Work Permit System and Work Instructions

All safety-critical activities and the supporting tasks shall have written procedures or work instructions in place as necessary. Safety-critical activities are those, which may have moderate, high or extreme risks.

Safety standards and operating procedures shall be listed in the SMS.

These procedures shall be made available and accessible to concerned staff in electronic & hard paper form.

A defined process for the development and review of safety standards, procedures and work instructions shall be in place which includes employee involvement. This process must ensure that best practices are incorporated and legislative requirements are met.

Location(s) safety rules / BPCL Life Saving Rules shall be given to all through card distribution, which shall be retained by them. Staff shall be encouraged to review & strengthen their own performances against these rules.

A Work Permit System shall be maintained for the planning, coordination, authorization and control of any maintenance activity (routine and non-routine) / other activities as specified by Locations to ensure that work is conducted safely and that personnel, the environment and facilities are protected.

Pre-Location inspection, Job safety plan and safety briefings shall be integrated in work permit system/ processes.

Locations shall also define work permit administration procedure wrt preparation, issue/ approval authorities and required qualifications to perform these tasks.

Record of work permits should be maintained at least for 3 months.

6.5.12. Job Safety Plan

All Locations shall define the requirements for identifying, assessing and controlling personal risks associated with work activities through developing a Job Safety Plans/ program. A JSP is essential prior to issue of a work permit. However, it may be conducted for non-work permit activities as well if relevant. The JSP shall be approved by designated managers

6.5.13. Emergency Response & Planning

A process shall be in place to identify and document credible health and safety incident scenarios. Appropriate procedures shall be developed and maintained to respond to each of these incident scenarios and for preventing and mitigating the consequences that may be associated with them.

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Locations shall document and maintain a comprehensive tiered emergency response and disaster management plan(s) for responding to abnormal situations and potential emergencies. The ERDMP shall conform to PNGRB updated regulations and other applicable regulations.

The plan(s) shall include:

- Credible health and safety incident scenarios based upon risk analysis studies
- Classification of emergencies;
- Organisation and responsibilities, identification of the incident command structure (command and control personnel);
- Systems and measures for minimising potential consequences e.g. through the mobilisation of support, evacuation procedures;
- Communications to command and control personnel, emergency services, employees and contractors who may be affected, others likely to be impacted, e.g. local communities;
- Requirements for training, emergency drills and assessment.

Copies of update plan shall be submitted to regulatory authorities and emergency management groups as constituted by government authorities.

6.5.14. Documentation

Each BU is recommended maintain a standardized documented safety management system manual that describes BU specific SMS requirements and aligned/consistent with Corporate Safety Management System Requirements. BUs may add additional elements or sub elements and more requirements.

BUs may structure this manual either in an integrated manner with other management system or standalone manner as fit to them and issue this to respective Locations for uniform enforcement.

The **BU Safety Management System Manual** may be structured as:

- BU Information
- Leadership and Accountability
- HSE Policy and Strategic Objectives
- Organization, Resources, Training and Competence
- Risks Assessment and Management
- Planning, Standard and Procedures
- Implementation, Monitoring and Performance Reporting
- Audits
- Management Review
- Definitions
- Abbreviations

Locations may further add their system documents as Annex to BU SMS Manual such as:

- Location Information
- Organizational Structure
- Responsibilities
- Annual Safety Plan including Strategic Safety Objectives
- Register of Hazards and Risks
- Register of Applicable Legislation
- List of Standard Operating Procedures
- List of Process Hazard Studies
- Safety Performance Metrics

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A system shall be in place for the management and control of all documents, in paper and/or electronic format, in use to manage safety. This shall include formal administration, custodianship for technical correctness and communication of correct use. As a minimum, the system will cover:

- HSE Policy
- Strategic objectives
- Annual plan
- Safety Management System Manual
- Register of laws and regulations as applicable to the Location;
- Process and instrumentation diagrams (P&IDs)
- Process Flow Diagrams (PFDs)
- Standard Operating Procedures for management and execution of safety critical activities;

  Appropriate supplier and contractor information;
- Product/material identification and composition data
- Register of Hazards & Risks
- Process Hazard Studies
- Emergency Response and Disaster Management Plan
- Location Safety statistics and trends
- Records of Implementation

Location shall establish a procedure for preparation, approval, control and maintenance of SMS documentation.

All documents shall be reviewed & approved by designated authorities.

6.5.15 Fleet Safety

Marketing shall demonstrate a systematic, documented and auditable approach to manage fleet safety risks associated with road transportation of BPCL products. It shall set requirements for:

- Responsibilities and ownership for fleet safety activities within BU;
- Mininimum basic requirements for fleet safety management system; contractor's management; driver's management; carriers/tank truck/tank lorry management and journey management.
- Identification of areas for Improvement to reduce the fleet safety risks to a level which is as low as reasonably practicable (ALARP).

All product transportation vehicles shall be equipped with a Vehicle Tracking System as per approved specifications.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Fleet Safety (BPCL/ CSMS/TS/06)**

6.6 Implementation, Monitoring and Performance Reporting

Purpose

This SMS element addresses the way activities are to be performed and monitored, and corrective action to be taken when necessary.

Basic Minimum Requirements

6.6.1 Implementation

Activities and tasks shall be conducted according to the standards, procedures and work instructions of the Location. Location shall ensure that there are systems in place to verify this.

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Safety critical activities with their performance indicators shall be specified in the SMS Manual. Each critical activity shall be assigned to an accountable party who shall monitor and regularly report the performance of their activity(s) using the indicators.

6.6.2 Non Compliance & Corrective Action

Locations shall maintain a system of identification of non-conformances& corrective actions.

The line officers/supervisors are responsible to regularly observe / monitor the performance of processes and personnel against documented requirements and procedures and identify non conformance and initiate investigation, corrective and preventive actions, wherever required. Section in charges shall undertake daily morning meeting before start of the shift work to discuss any compliance issue, suggestions or concerns of the staff.

BPCL shall gradually include safety performance criteria in staff appraisal system for better monitoring of performance and individual accountability.

6.6.3 Compliance to Applicable Laws and OISD Codes

All installation heads shall ensure their operations identify all requirements and comply with all relevant Central, State & Local Legislation and OISD Codes or exceed the requirements, as practicable. Competent Staff shall be clearly identified, who shall be responsible for legal compliance management.

Each Location shall develop a Register identifying applicable Legislation and compliance requirements. This register shall list all applicable legislation, requirements, permits and compliance status. Periodic evaluation of compliance shall be done by senior management & accordingly compliance actions may be initiated, if required.

6.6.4 Behavioural Improvement Training & Program

All Locations shall develop appropriate Behavioural based Safety Program to continuously identify Potential at risk behaviours& their management. Behavioural Based Safety training shall be regularly provided to relevant staff including line officers/supervisors.

All personnel have a responsibility to:

- Carry out their work in a safe and environmentally responsible manner
- Stop inappropriate / unsafe behaviour when witnessed
- Stop any activity which they believe poses an unacceptable risk to their or others health, safety or the environment.
- Line managers shall provide leadership in the use and conformance with the behaviour improvement program.
- Line management shall recognize and reinforce positive behaviour.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Behaviour Based Safety (BPCL/CSMS/TS/10).**

6.6.5 Safety Performance Indicators and Reporting

Locations shall define, maintain and update regularly their safety performance indicators (leading and lagging including process safety events) to measure the effectiveness of their SMS and to evaluate stakeholder concerns.

The matrix shall define at a minimum the items to be monitored and measured, frequency of monitoring/ measurement, responsibilities and the records to be generated. The metrics shall be revised whenever there are changes on the identified safety issues at the location.

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Where equipment is required for performance measurement and monitoring, the location shall establish and maintain procedures for the calibration / maintenance of such equipment and for data handling / interpretation.

Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Safety Performance Metrics (BPCL/CSMS/TS/07).**

📖 **Refer BPCL Technical Standard on Process Safety Events (BPCL/CSMS/TS/08).**

6.6.6 Incident Reporting, Investigation &Followup

BPCL classification of the safety incidents includes:

- Major Incidents
- Serious Incidents
- Minor Incidents

All safety incidents regardless of their severity to the employees, contractor's employees, visitors and public shall be reported through BPCL on-line Incident Reporting System (IRIS) promptly.

All **" Serious and Major** " safety incidents shall be reported to respective business unit and corporate HSSE in accordance to BPCL Internal Incident Reporting System.

Locations are responsible to communicate to Governmental Departments as required by the applicable laws and regulations and in prescribed forms and within stipulated timeframe.

Locations shall maintain procedures for the reporting and investigation of hazardous situations, near misses and incidents. This procedure includes shall include:

- Near misses
- Dangerous occurrences
- First Aid Cases
- Medical Treatment Cases
- Lost Time Injuries
- Reportable Lost Time Injuries
- Fatalities
- Notifiable Diseases
- Fire / Explosion / Gas release/Spill cases
- Notices from Regulatory Authorities
- Lost Time Injury Frequency Rate (LTIFR);
- Loss Time injury Severity rate (LTISR);
- Reportable Lost Time Injuries Frequency Rate (RLTIFR)
- Marketing Incidents
- Incidents at consumer premises

The procedures shall conform with the BPCL requirements and applicable legislation. Locations shall foster a culture of openness in reporting all incidents and near misses.

All incidents regardless their classification in respective Category (i.e. Minor, Serious and Major) should be duly reported, recorded and investigated. However, the extent of incident investigation may vary depending upon the severity of incidents and associated property damage & financial losses.

For all "Major " safety Incidents, representative(s) from Corporate HSSE shall be part of the investigation Team.

For "Serious " safety incidents, representative(s) from HQ HSSE shall be part of the Investigation Team, if deemed necessary.

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Team leader to ensure that the Detailed Investigation Report for all Serious and Major Incidents is issued within 21 calendar days after the date of incident.

Training shall be provided in incident investigation to appropriate staff, who shall be involved in incident investigation.

Any corrective or preventative action taken to eliminate the causes of potential incidents shall be appropriate to the magnitude of problems and commensurate with the risks encountered.

The location shall implement and record any changes in the documented procedures resulting from corrective and preventative action.

Lessons learnt from accidents and incidents shall be disseminated to relevant personnel and contractors

The normal sequence of events following an incident shall be as follows:

- immediate control of any hazards and impacts (such as injuries)
- report the incident to immediate supervisor/ Department Head
- report the incident to authorities (where required)
- notify other personnel using alert notification as per Emergency Response Plan
- conduct an appropriate investigation
- assign recommended actions
- ensure agreed actions are completed and update hazard & risk register & procedures, as relevant.
- ensure the risk has been reduced to an acceptable level.
- share relevant learning's arising from the incident with others
- add key learning from incidents or near misses to the relevant plant Dossiers.

Time bound corrective / preventive and follow up action needed to eliminate the causes of incidents shall be identified, implanted and monitored by installation heads.

Locations shall carry out quarterly and annual analysis of all the safety incidents to find out common causes of the incidents.

Relevant BPCL Technical Standard

📖 Refer BPCL Technical Standard on Incident Reporting, Classification and Investigation(BPCL/CSMS/TS/09).

6.6.7 Records

Locations shall establish procedures to maintain appropriate records to demonstrate conformance to the Location's SMS. As a minimum:

- The records shall be legible, identifiable and traceable to the activities involved with retention times defined;
- The records shall be stored and maintained to prevent loss and unintended use;
- The records shall be used in improvement planning.
- Locations shall regularly measure, record, track and report safety performance against targets set in the Annual Safety Plan and in maintaining control of safety-critical activities.
- Procedures shall be established and maintained for the identification, maintenance and disposition of safety performance records which shall include:
- Reports of audits and reviews;
- Audit tracking data;
- Situations of non-compliance and of improvement actions;
- Any incidents and follow-up actions;
- Any complaints and follow-up actions;

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- Inspection and maintenance reports of safety-critical equipment i.e. equipment providing a control and recovery function;
- Data obtained from monitoring as input to performance records;
- Results of emergency drills and exercises;
- Training records

6.7. Safety Assurance

Purpose

To systematically assess and review the Location's safety management system to ensure effectiveness, suitability and fitness-for-purpose is sustained and improvement plans are developed at each level of the organization.

To provide assurance to management and other stakeholders that the SMS Expectations and related processes are properly understood, implemented and executed.

Basic Minimum Requirements

6.7.1 Audit Programme / Plan

A compliance assurance programme shall be in place to review and verify effectiveness of the safety management system. It shall at least include:

- Internal Audits by the Location/ BU
- External audit by OISD and other third party audits
- External Certification Audits
- Corporate Safety Management System Audit
- Process Safety Audits
- Special audits such as electrical safety, IS 14489 audits etc.

Process safety audits are recommended once in three years.

Locations shall prepare annual audit plan based on type of audit with defined scope, objectives, time frame and selection of auditors.

Audit findings are recorded/prioritized and corrective actions are identified with assigned action parties and targeted completion dates.

Audit findings and follow-up are tracked to final close-out.

Best practices and lessons learned are shared with all locations/assets as appropriate.

6.7.2 Corporate Safety Management System Audit

The periodic audit shall be conducted to verify conformity with the Corporate Safety Management System Requirements. Audit objectives shall include conformity assessment with corporate safety management system requirements; evaluate the implementation status and reporting the audit results to corporate HSSE Council.

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Relevant BPCL Technical Standard

📖 **Refer BPCL Technical Standard on Corporate Safety Management System Audit (BPCL/CSMS/TS/11).**

6.7.3 Auditor Competency

It shall be ensured that the internal auditors have no responsibility or direct control on the department being audited by them. A "List of qualified SMS auditor" shall be maintained and up dated by Location HSSE role holder.

Auditors shall be selected based on their successful qualification of any recognized /accredited auditing course of minimum days as may be prescribed by Corporate-HSSE.

6.8 Management Review and Improvement

Purpose

Management shall regularly review the suitability and effectiveness of the SMS.

Basic Minimum Requirements

6.8.1 Review Process

A formal process shall be in place for senior management to review the effectiveness and suitability of the SMS in managing health and safety risks and ensuring continuous improvement in safety performance. The Review shall address but not be limited to:

- Compliance to HSE policy and strategic objectives;
- The impact of significant organizational, location or activity changes;
- The safety concerns of employees, contractors and external stakeholders;
- The provision of adequate resources and competent personnel to achieve strategic objectives and annual plan;
- Audit findings;
- Technical integrity for those issues with considerable potential safety consequences;
- Verification of closure of corrective actions resulting from management reviews, audits, inspections and incident investigations and review of legal compliance

Management Reviews of the SMS shall take place on half yearly basis preferably within the Business Plan cycle and to be reported to BU/ Corporate HSSE.

BU HSSE role holder shall assess the completeness and validity of the data used as the basis for review and submission to corporate.

6.8.2 Improvement

Identified improvement actions are planned and communicated, with implementation tracked to completion.

7. Stakeholders Engagement

Corporate/ BU/Locations shall develop and maintain an active communication with its stakeholders on safety concerns/issues and maintain appropriate engagement / consultation pro active strategies.

The key stakeholders shall include

- Customers
- Dealers and Distributors
- Employees and their families
- Transporters
- Contractors/Sub contractors

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- Government Agencies
- Ministry of Petroleum and Natural Gas
- Petroleum and Natural Gas Regulatory Board
- Oil Industry and Safety Directorate
- State Factory Departments
- Pollution Control Boards
- Petroleum and Safety Organization
- Local communities
- Share holders
- Suppliers
- NGOs
- Media
- Research Centres
- Academia

8. Definitions

Accident	A specific unplanned event or sequence of events that has resulted in undesirable consequences/property damages/ Injury/ Il health or combination.
Activity	Work to be carried out as part of a process characterised by a set of specific inputs and tasks that produce a set of outputs to meet customer requirements.
As Low as Reasonably Practicable (ALARP)	To reduce a risk to a level which is as low as reasonably practicable involves balancing reduction in risk against the time, trouble, difficulty and cost of achieving it. This level represents the point, objectively assessed, at which the time, trouble, difficulty and cost of further reduction measures become unreasonably disproportionate to the additional risk reduction obtained. **Acceptable Risk**: Risk that has been reduced to a level that can be endured by the organisation having regard to its legal obligations and HSE policy. The level of residual safety risk based on risk assessment that can not be endured with, shall be treated as unacceptable risks.
Asset	A company possession having value which is used to generate revenue. In context of safety management asset normally means hardware e.g. vessels, pipes, buildings. In more general context asset is also used in context of software e.g. useful quality, skills, expertise (or persons).
Assessment (or evaluation)	The process of analysing and evaluating hazards. It involves both causal and consequence analysis and requires determination of likelihood and risk.
Audit	An independent, systematic and documented process of objectively obtaining and evaluation verifiable evidence to determine that business controls: - are complete and consistent - are effective and efficient - safeguard the company's resources and promote their effective use - provide, and protect the integrity of, required records and information - allow for compliance with policies, chosen standards, laws and regulations.
Company	BPCL or Contractor's organization as registered under Applicable law in India.
Consequence	A measure of the expected outcome of an incident.
Continuous improvement	Process of enhancing the safety management system to achieve improvements in overall safety performance in line with the organisations HSE policy.
Safety Critical activities	Activities that have been identified by the Hazards and Risk Assessment Process as vital to ensure asset integrity, prevent incidents, and/or mitigate adverse safety consequence.

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Event	An occurrence or situation represented as a node in event and fault trees (e.g. gas leak, status of gas detection system, status of ESD system).
Hazard	An object, physical effect or condition with the potential to harm people, property, the environment or company reputation. (Note: OHSAS 18001: 2007 - source, situation or act with a potential to cause human injury or ill health or combination of these).
Hazardous event	The 'release' of a hazard. The undesired event at the end of the fault tree and at the beginning of an event tree. The centre point in a Hazard 'Bow-Tie'. An incident which occurs when a hazard is realised (e.g. release of gas, fire, loss of buoyancy).
Hazard Identification and Risk Register	A document that demonstrate that activity specific hazards have been identified, assessed, are being properly controlled through identified control measures.
HAZOP	Hazard & Operability study, a structured risk identification and analysis tool that is used at various project stages.
Strategic Safety Objectives	The broad goals, arising from the HSE policy, that a company sets itself to achieve, and which should be quantified wherever practicable.
Incident	An event or chain of events which has caused or could have caused fatality, injury, illness, and/or damage (loss) to assets, the environment, company reputation or third parties. (Note: An incident where no injury, fatality or ill health has occurred, may also be referred as Near Miss, Close Call, near hit or dangerous occurrence).
Likelihood analysis	The process of estimating the likelihood of an event. Also, referred to as probability analysis.
Location	Location includes plant / installation / retails Location/ project Location
Lost Time Injury (LTI)	An injury causing disablement extending beyond the day of shift on which accident occurred.
Loss of Primary Containment (LOPC)	An unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials (e.g. steam, hot condensate, nitrogen, compressed CO2 or compressed air). For drilling operations, any unplanned or uncontrolled release to the surface (seabed or ground level) should be included. LOPC is a type of event. An unplanned or uncontrolled release is an LOPC irrespective of whether the material is released into the environment, or into secondary containment, or into other primary containment not intended to contain the material released under normal operating conditions).

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Lost Time Injury Frequency Rate (LTIFR)	The total number of Lost Time Injuries per million man hours worked during the period. Calculation = No. of LTI's (Own Employee + Contract). x 1,000,000 / Total Man Hours (Own Employee + Contract) *Note : These can be calculated separately for own employees and contractors respectively.*
Major Accident	Major accident as defined in ERDMP Regulations,2010 / MSIHC Rules
Man days Lost	It is the total disability / forced absence period in days of all the injured persons arising out of the major injury, serious injury and minor injury.
Monitoring activities	All activities related to the prevention or mitigation of hazardous events.
Near Miss	These are incidents / occurrences wherein an accident has not happened but could have happened i.e. normally missed.
Organisation	Company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration NOTE -For organisations with more than one operating unit, a single operating unit may be defined as an organisation.
Performance criteria	Performance criteria describe the measurable standards set by company management to which an activity or system element is to perform. (Some companies may refer to performance criteria as goals or targets.)
Performance indicator	Comparative, quantitative measures of actual events, against previously specified targets, which provide a qualitative indication of future projected performance based on current achievement.
Procedure	A documented series of steps to be carried out in a logical order for a defined operation or in each situation. A series of steps to be carried out in a logical order for a defined operation or in each situation
Piping & Instrumentation Diagram (P&ID)	This is to be generated for each stage of a covered process. It should reflect the as-built equipment setup, instrumentation & controls, safety system and interlocks included in a covered process. A P&ID is the one document that when properly completed shows the most information pertaining to the technology of the covered process. It is generally considered to be the single most vital document that must be used when performing a Process Hazard Analysis (PHA).
Process Safety Information	Data associated with the chemical agent, the process technology and the equipment within the covered process area that is necessary for affected individuals to operate the process safely, reliably and efficiently.
Process	A logical sequence of inter-related activities.

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Quantitative Risk Assessment (QRA)	QRA provides a structured approach to assessing the potential for incidents and expressing this potential numerically. In QRA statistical values are derived for potential loss of life and damage to resources and environment. Note: These values should not be interpreted as unavoidable and acceptable losses. It should always be recognized that the calculated fatality (or loss) figures are based on experience, statistical failure and incident rates representing an average historical quality of management. QRA is a tool which helps to translate this hindsight into foresight (planning) to assist management in deciding the best approach and show ways and means (e.g. improved engineering, procedures, supervision, etc.) to prevent the potential incidents from happening. QRA is not to be used to justify or encourage risk taking.
Reportable Lost Time Injury	An injury causing death or disablement to an extent as prescribed by the relevant legislation (This is taken as absence from work place more than 48 hours beyond the day of shift on which accident occurred).
Reportable Lost Time Injury Frequency Rate	The total number of Lost Time Injuries per million man hours worked during the period. Calculation = No. of RLTI's (Own Employee + Contract). x 1,000,000 / Total Man Hours (Own employee + Contract) Note : These can be calculated separately for own employees and contractors respectively.
Risk	Risk = Consequence Score X Probability of Occurrence. (Note: OHSAS 18001: 2007 combination of the likelihood of an occurrence of a work-related hazardous event or exposure(s), and the severity of injury or ill health that can be caused by the event or exposures).
Risk Assessment	The process of determination of risk, usually in a quantitative or semi-quantitative manner. It is an evaluation of the likelihood of undesired events and the likelihood of harm or damage being caused together with the value judgments made concerning the significance of the results. Note the difference between Risk Assessment and Task Risk Assessment in this Guidance.
Risk Classification	A rating used to derive an appreciation of the relative risk from a hazard. The Risk Matrix may be used to assist to determine this rating. Both the relative probability and the potential consequence are categorised by 5 point scales.
Risk Matrix	The matrix portraying risk as the product of probability and consequence, used as the basis for qualitative risk determination. Considerations for the assessment of probability are shown on the horizontal axis. Considerations for the assessment of consequence are shown on the vertical axis. Four consequence categories are included: impact on people, assets, environment and reputation. Plotting the intersection of the two considerations on the matrix provides an estimate of the risk.

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9. Abbreviations

API	American Petroleum Institute
ANSI	American National Standard Institute
ALARP	As Low as Reasonably Practicable
BPCL	Bharat Petroleum Corporation Limited
BSMS	BU Safety Management System
BU	Business Unit
CSMS	Corporate Safety Management System
DIR	Detailed Investigation Report
ERDMP	Emergency Response and Disaster Management Plan
ETA	Event Tree Analysis
FEED	Front-End Engineering Design
FMEA	Failure Modes and Effects Analysis
FTA	Fault Tree Analysis
HOD	Head of the Department
FAC	First Aid Case
FIR	First Hand Incident Report
HSSE	Health, Safety, Security, Environment
HAZOP	Hazard and Operability Analysis
HIRA	Hazard Identification and Risk Assessment
IRIS	Incident Reporting and Investigation System
ISO	International Organization for Standardization
IS	Indian Standards
IPRA	Individual Risk Per Annum
JHA	Job Hazard Analysis
KPI	Key Performance Indicator
LSMS	Location Safety Management System
LSR	Life Saving Rules
LTIFR	Lost Time Injury Frequency Report
LSIR	Location Specific Individual Risk
LOPC	Loss of Primary Containment
LOPA	Layers of Protection Analysis
LOTO	Lock out Tag out
LoPC	Loss of Primary Containment
MoPNG	Ministry of Petroleum and Natural Gas
MOC	Management of Change
MAH	Major Accident Hazard
MIS	Management Information System
NFPA	National Fire Prevention Association
NGOs	Non-Governmental Organizations
OISD	Oil Industry Safety Directorate
RLTIFR	Reportable Lost Time Injury Frequency Rate
OHS	Occupational Health Services
OHSA	Occupational Health and Safety
PCVO	Public Carrier Vehicle Operators
PRD	Pressure Relief Device
PSE	Process Safety Events

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P & ID	Piping & Instrument Diagram
PFD	Process Flow Diagram
PHAST	Process Hazards Analysis Software Tool
QMS	Quality Management System
QRA	Quantitative Risk Assessment
RP	Recommended Practice
RAM	Risk Assessment Matrix
SDS	Safety Data Sheet (earlier used as MSDS)
SWP	Safe Work Procedure / Standard Operation Procedure
SMS	Safety Management System
SIL	Safety Integrity Level Assessment
TS	Technical Standard
WPS	Work Permit System

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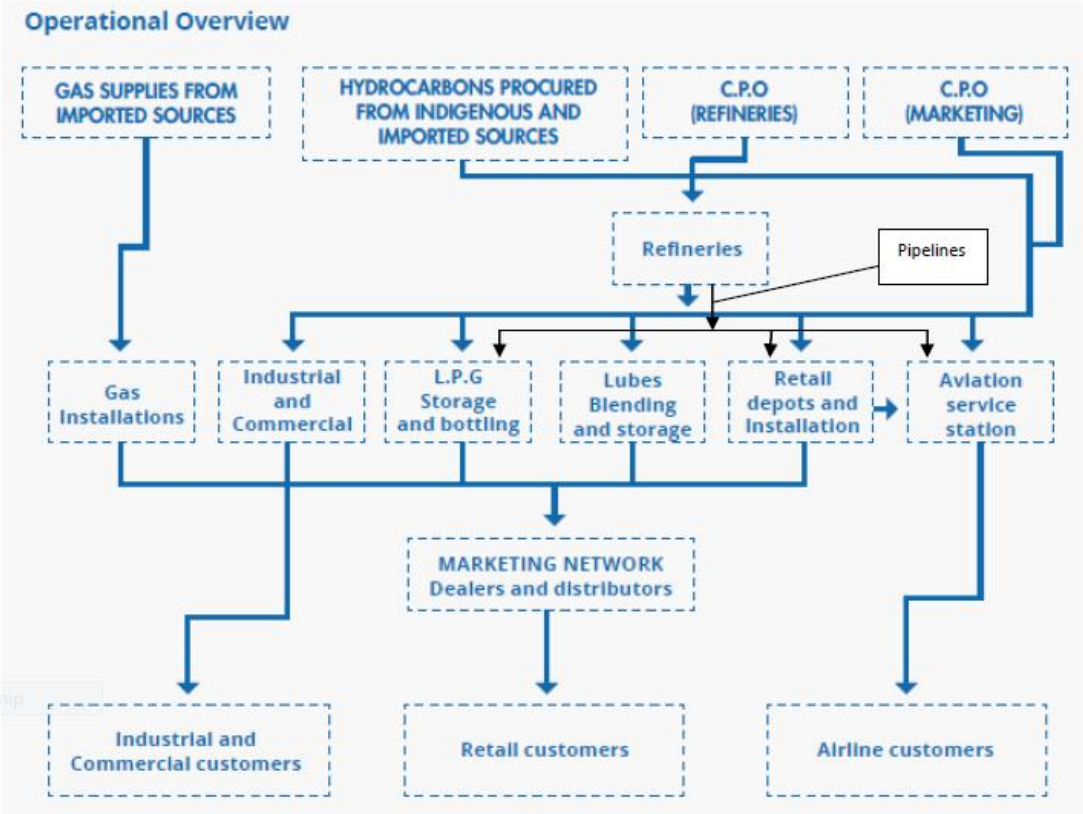
Appendix 1 : BPCL Operational Overview



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Appendix 2 : BPCL Corporate HSE Policy

HEALTH, SAFETY AND ENVIRONMENT POLICY

Commitment

Together, we have the highest concern and commitment for protecting the Health and Safety of all employees, contractors, customers and the communities in which we operate and for conservation of the Environment.

We will comply with all Statutory Regulations and may even go beyond these for the benefit of our environment.

We consider Health, Safety and Environmental aspects are an integral part of our business planning and operation processes.

Policy

Based on these guiding principles, we shall:

Demonstrate our commitment by…….

- Providing and maintaining safe facilities and working conditions.
- Recognizing that all employees have responsibility for their own safety and actions which could affect the safety of others.
- Adoption of appropriate technologies to minimize the impact of our activities on the Environment.

Establish Clear objectives and targets to ……..

- Improve continuously for prevention of accidents & occupational illnesses and minimizing any impact of our activities on the environment.
- Promote learning through training and sharing of experiences and best practices; including with contractors, customers and the public, wherever required.
- Inculcate values and attitudes conducive to achieve excellence in Health, Safety and Environmental performance.

Provide means to achieve our mission by ……..

- Assigning clear roles and responsibilities at all levels and periodically reviewing and recognizing contribution to HSE objectives.
- Allocating adequate resources.
- Fostering a spirit of participation by all employees in Health, Safety and Environmental conservation efforts.
- Creating appropriate forums for deliberations on Health, Safety and Environmental issues.

Monitor performance by ……..

- Periodically auditing work processes, systems & practices and promptly correcting deficiencies.
- Incorporating HSE performance as a parameter for assessing the overall performance of Employees, Business Units, Contractors and Business Associates

Date

Bharat Petroleum Corporation Limited.

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Appendix 3 : BPCL 12 Life Saving Rules

12 LIFE SAVING RULES

BPCL's 12 life saving rules are designed to protect your Life!
These rules must be respected and complied with at all times.

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RULE # 1: PPE
No work without mandatory Personal Protective Equipment

RULE # 2: Lock Out and Tag Out
Verify isolations before work begins and LOTO equipment are put in place

RULE # 3: Working at Height
Use Full Body Harness, anchored with rigid connection and safety helmet with Chin Strip tightened while working at height > than 6 feet

RULE # 4: Obtain and Follow Work Permit System
Obtain Work Permit before start of work and follow all conditions

RULE # 5: Confined Space Entry
Obtain Authorization before Confined Space Entry and ensuring no hazardous atmosphere inside based on gas test certificate

RULE # 6: Safety System Override
No overriding or disabling safety critical equipment without pre authorization from designated person

RULE # 7: Follow JSP / SOP
Always follow Job Safety Plan / Safe Operating Procedures (SOP)

RULE # 8: Management of Change
No modifications without MOC signed and authorized

RULE # 9: Wear Seat Belt
All occupants of four wheelers and product transportation fleet to wear seat belt

RULE # 10: Intervene
Intervene if somebody violates the Life Saving Rules

RULE # 11: Authorized Personnel Only
Don't operate any equipment or enter any area for which you are not authorised

RULE # 12: Alcohol and Drugs
No use of alcohol or drug whilst working or driving

In case of any doubt regarding above LSRs, please consult your Location HSSE Officer or Supervisor.

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Appendix 4 : Sample Template for Documenting Strategic Safety Objectives

CORPORATE STRATEGIC SAFETY OBJECTIVES	BU STRATEGIC SAFETY OBJECTIVES	LOCATION STRATEGIC SAFETY OBJECTIVES
1 Commitment to Achieve Goal Zero 2 No harm to People ,Asset and Environment 3 Design, Operate and Maintain our Assets to minimise risks to a level which is As Low As Reasonably Practicable (ALARP)	***Note : These are Examples Only*** *(BU shall develop their own stregic safety objectives based on their priorties and risks)* 1. **LEADERSHIP** A. Enhance Safety Visibility of Leadership Team by monthly safety walk by location head, functional heads, managers, supervisors. B. Introduce BPCL 12 Life Saving Rules to all Employees and Contractors. **2. ROAD SAFETY** Fully Functional VTS in All Vehicles and Post Trip Feedback on Behaviour data. **3. BEHAVIOUR SAFETY** Implement BBS in Plants **4.PROCESS SAFETY** A. Provide Process Safety Training to All Employees B. Establish Software based HAZOP process in all New Projects C. Implement Process Safety as per OSHA Standard 1910.119 **5. SYSTEM IMPROVEMENT** Align BU SMS as per Newly Introduced Corporate Safety Management System	Locations shall define timelines wrt BU Strategic Safety Objectives.

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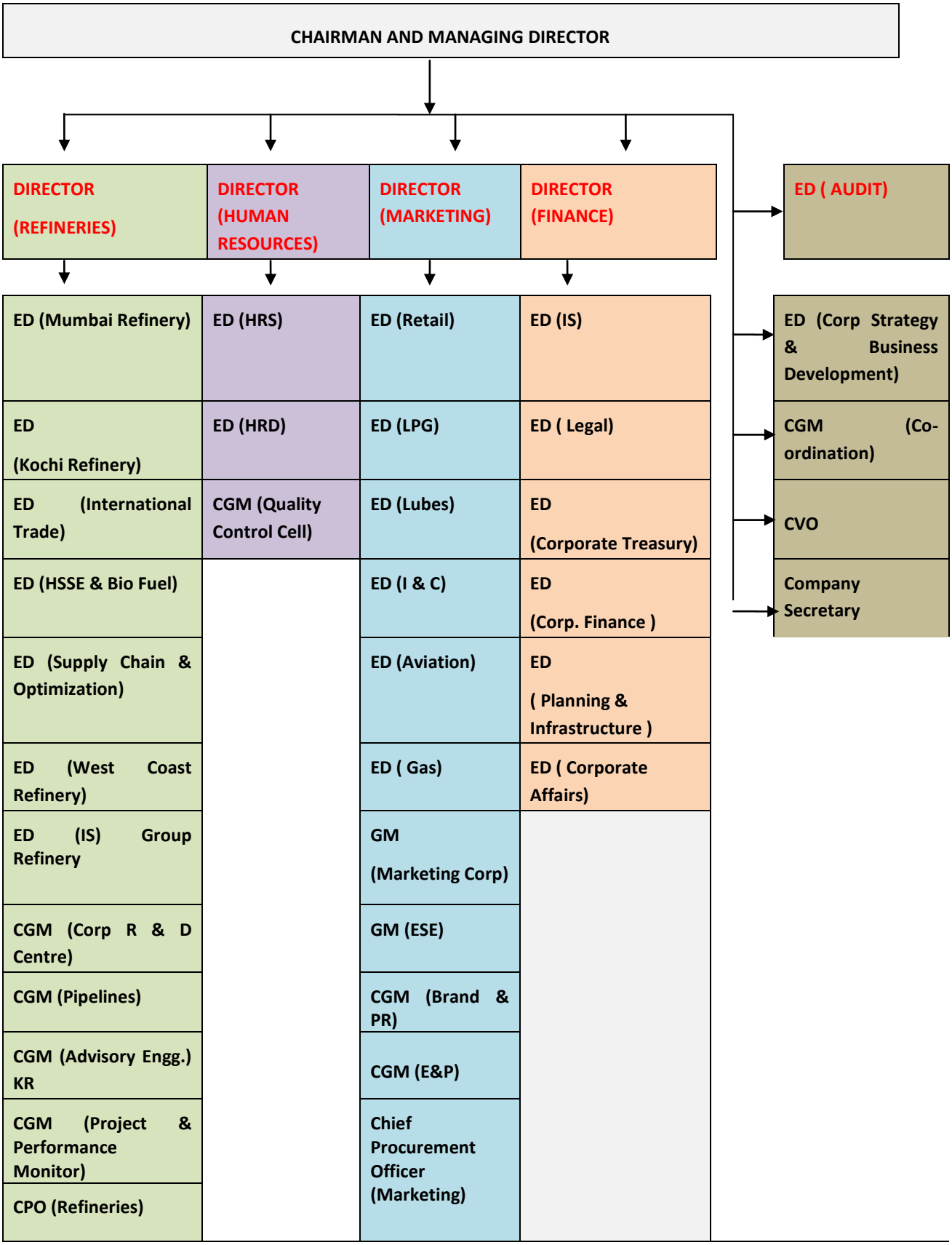
Appendix 5 : BPCL Organizational Structure



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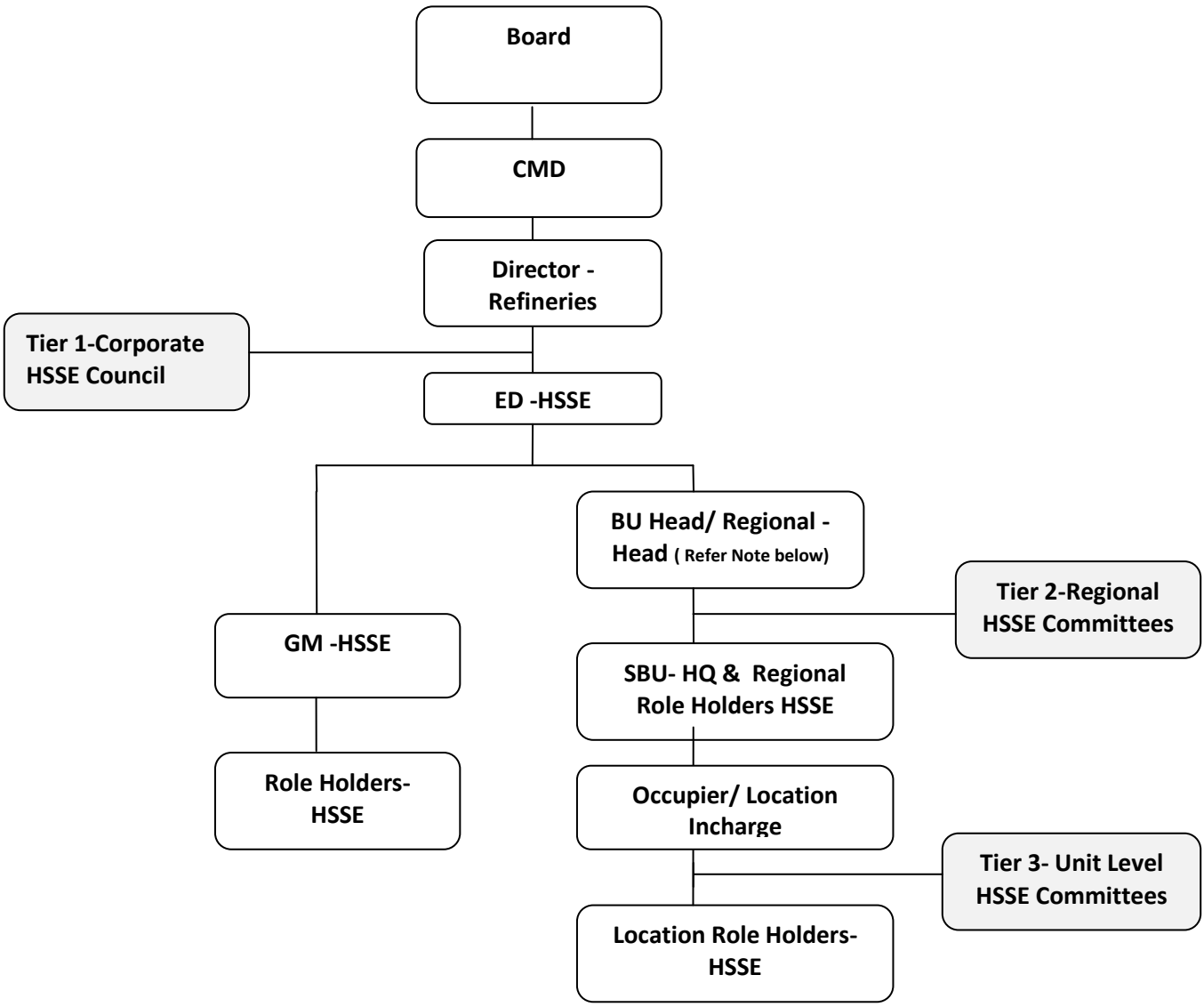
Appendix 6: BPCL HSSE Administration Structure



EXISTING ROLES: REVIEW / INVESTIGATION/ DATA REVIEW/ AUDIT/ CORRECTIVE ACTIONS

Note : This excludes Refinery SBU

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Appendix 7 : Inter Relationship of HSSE Committees and Functions

BPCL has adopted 3 Tier HSSE committee structure. The interrelationship and functions are described below:

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Appendix 8 : Roles & Responsibilities

Board of Directors

In their corporate strategy and governance role the Board of Directors will maintain an overview of the progress made by group companies to implement their safety management system in accordance with the documented BPCL Corporate Safety Management System. Board's sustainability committee steers BUs on key issues that may affect achievement of BPCL's strategic safety objectives and compliance with the corporate safety policy and BPCL Technical Standards.

SBU Heads

BU -Heads are accountable to CMD for their safety performance. They are responsible for the BU's adoption of safety management system which is 'fit for purpose' and which, as a minimum, meets the BPCL Corporate Safety Management System Requirements and Expectations. This could include specific Requirements and Expectations additional to those specified by BPCL. They shall provide appropriate resources to develop and implement the safety management system.

Corporate HSSE Division

Corporate HSSE broad functions shall be the custodian of the BPCL Corporate Safety Management System. Its broad functions shall include:

- provide technical advice to the Board of Directors and corporate and Regional HSSE councils;
- Provide guidance to BUs on the design, implementation and monitoring of Corporate Safety Management System at group level;
- periodically review its suitability, adequacy and effectiveness;
- custodian of corporate safety performance metrics;
- collect, analyse and report safety performance data;
- alert respective BU heads as and when required on key weaknesses;
- review and report group monthly and annual performance, annual compliance letters, best practises to the Directors and the BPCL CMD;
- Incident investigation and reporting;
- provide specialized training to BUs;
- perform safety assurance activities, e.g., inspections, assessments and audits. The findings of these assurance activities will be reported to the respective BU heads and their HSSE Role Holders;
- Maintain an "Electronic Safety Resource Technical Library" to facilitate sharing of BPCL Corporate Safety Management System Requirements, Best Practices and Lessons Learned.

BU HSSE Role Holders

The BU HSSE broad functions shall be the custodian of the BU SMS. Its broad functions shall include:

- Managing safety knowledge within BU
- provide technical advice to the BU- Heads and Regional HSSE councils;
- develop the 'fit for purpose' safety management system in accordance to Corporate Safety Management System Requirements, OISD and other requirements;
- Develop BU specific standards, procedures, guidelines and training resources;
- Provide guidance to operating Locations on the design, implementation and monitoring of Corporate Safety Management System at BU level;
- periodically review its suitability, adequacy and effectiveness;
- custodian of BU safety MIS;
- collect, analyse and report safety performance data;
- alert respective Location's head as and when required on key weaknesses;
- review and report BU monthly and annual performance, annual compliance letters, best practises to the BU Heads, Corporate HSSE and Regional Councils;

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- Incident investigation and reporting;
- provide specialized training to Location's personnel;
- perform safety assurance activities, e.g., inspections, assessments and audits. The findings of these assurance activities will be reported to the respective BU heads and their HSSE Role Holders;
- establish a document control system for the safety management system, critical studies, reports etc.

Line Managers

- Respond to and correct any hazardous conditions in the workplace;
- Regularly communicate status of ongoing issues with affected employees;
- Attend departmental safety meetings;
- Continuously reinforce safe behaviours through coaching, counselling, and discipline;
- Investigate all incidents in their own department for corrective actions, follow through, and the corresponding closure of the implemented corrective actions;
- Complete and submit all safety reports on a timely basis
- Attend regularly all training sessions;
- Conduct safety inspections;
- Conduct Job Safety Analyses on a regular basis;
- Be visible role models in safe behaviour;
- Ensure that all contractors are managed or supervised to ensure compliance with the safety rules and standard operating procedures;

Employee:

- An employee including contractor workman shall take reasonable care for their own safety and that of co-workers
- Co-operate with management to comply with safety rules. standards and standard operating procedures;
- An employee shall not intentionally or recklessly interfere with or misuse anything provided at the workplace in the interest of protection or management of the Environment and Safety of Personnel & Asset.
- Follow all Location Safety Rules
- Wear and/or use the prescribed protective equipment
- Report all hazardous conditions, equipment and tools
- Immediately report any near miss, injury or illness incidents to supervisor or manager.

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Appendix 9: Indicative List of Training (Level 1 and 2)

No.	Course	Who	Level	When	Competency Alternative	Delivered By
1.	Safety Orientation	All	1	Entry	No	HSSE or ATP
2.	Assigning a mentor	All	1	Entry	No	Concerned Job owner
3.	Standard Operating Procedure/ Task Familiarization	All	1	Before work	No	Concerned Job owner
4.	Equipment Familiarisation	All	1	Before work	No	Concerned Job owner
5.	Work Permit Signatory	Role based	2	Before commencing role	No	HSSE Role Holders
6.	Work Permit Holder	Role based	2	Before commencing role	No	HSSE Role Holders
7.	Confined Space with SCBA	Role based	2	Before Commencing role	No	HSSE Role Holders
8.	Authorized Gas tester	Role based	2	Before commencing role	No	HSSE Role Holders
9.	Electrical Maintenance	Role based	2	Before commencing role	No	ATP
10.	Fire responders	Role based	2	Before commencing role	No	ATP
11.	Job Competency Assessment by next level	Role based	2	Within one month of role	No	Mentor
12.	Working with scaffold	Role based	2	Before commencing role	Industry	Recognized institute
13.	Conducting Risk Assessment	Role based	2	Before commencing role	Industry	Recognized institute
14.	Crane/ Lifting machine operator	Role based	2	Before commencing role	Industry	Recognized institute
15.	Supervision lifting operations	Role based	2	Before commencing role	Industry	Recognized institute
16.	First aider	Role based	2	Before commencing role	Industry	Recognized institute

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17.	Process safety	Role based	2	Before commencing role	Industry	ATP
18.	Safety Leadership programme for officers	Officers	2	Within 6 months of role	BPCL	ATP
19.	Safety Leadership programme for managers	Managers		Within 6 months of role	BPCL	ATP

Notes:

1. Role based, means only people who are entrusted in that specific task.
2. Industry/recognized institutes means courses / qualification obtained from external recognized organizations.
3. ATP means Approved Training Provider (Internal or external)

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BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Contractor Safety Management

(BPCL /CSMS/TS/01)

Approved By	**ED,Corporate -HSSE**
Issued By	**GM, Corporate -HSSE**
Document No	**BPCL/CSMS / TS / 01**
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Effective Date	**01.04.2018**

Corporate HSSE

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Date	**Revision Number**	**Change Summary**
01.04.2018	**V.1**	**Initial Version**

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1.0 Purpose

BPCL utilizes contractors for a variety of services. We recognize our responsibility in providing these service providers with a healthy and safe work environment that does not adversely impact safety of themselves, other personnel and plant. BPCL is committed to managing health and safety risks and improving safety performance.

BPCL has a developed a Corporate Safety Management System (CSMS) which defines specific requirements for managing OHS risks across its operations in accordance to its HSE policy and stakeholders expectations. The **Element 3 of BPCL Corporate Safety Management System : Organization, Resources and Competence** requires that each BPCL Location adopts a systematic approach to the management of contractors so that the risks to health and safety of contractors, employees, the community and the environment are minimized.

The purpose of this Technical Standard is to define the broad minimum requirements / guidelines for managing safety aspects of contractors in BPCL Locations including the **pre-qualification /selection ;contract preparation and award ;pre job meeting and training ;execution of work and performance monitoring; and post contract evaluation of contractors**. Each BPCL BU shall develop and implement a contractor safety management program (CSM) that is aligned with the requirements as detailed in this standard.

NOTE : The requirements/guidelines outlined in this standard are flexible and BU/ Locations may BUs can define additional requirements in their overall contract management procedures/processes.

2.0 Applicability

This standard applies to all BUs and Locations that use a contractor for work activities including, operation, maintenance , construction and other similar services regardless the size and value. This TS applies to long-term, short-term or one-time contractor usage.

*Exclusion : **EPC Project of new Location or modernization/expansion of existing Locations are not covered under the scope of this Technical Standard.** They are separately covered in BPCL Technical Standard on Project Safety Management (TS -05).*

3.0 References

- BPCL HSE Policy
- BPCL Corporate Safety Management System
- BPCL Technical standard on Risk Assessment and Management
- BPCL Technical standard on Project Safety Management
- OISD-GDN-207- Contractor Safety

4.0 Responsibilities

Corporate- HSSE is responsible for developing and updating this standard to ensure its continued relevance to BPCL. Corporate HSSE shall also communicate this TS to all concerned role holders in BPCL.

Business Units / BU HSSE are responsible for developing and implementing a contractor management program that meets the requirements suitable to their needs and meeting the requirements in this standard. The program may be integrated with existing purchasing and procurement systems. In addition, local, state or national legislation relating to contractors must be identified and complied with.

Location HSSE Role Holder shall define the roles, responsibilities and accountabilities for all personnel who play a role in implementing this standard within his Location.

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Each Location shall appoint an **Officer-in-Charge**, who shall have single point responsibility for monitoring the activities of the contract and verification that the control mechanisms are in place and complied with.

Each contractor to nominate an individual **(Contractor's Safety Representative)** with the right level of safety competence and authority to ensure compliance to BPCL requirements.

Note : Refer **Appendix 1** for detailed roles and responsibilities description of BPCL Location Head / BPCL Officer-in Charge / BPCL HSSE Officer/ BPCL Safety Officer/Contract Executing Agency / Contractor's Supervisor / Safety Officer/contract workers/ consultant/designer.

5.0 Requirements

Each BU/Location will develop and implement a written Contractor Safety Management Program based on the 5 Tier process as recommended in Section 6.0 below.

6.0 BPCL Contractors Safety Management Process

To manage the health and safety risks arising from using contractors, It is recommended that BU/Locations implement a 5 Tiered process as explained below to integrate safety aspects in overall contractor hiring process***. It is not necessary to maintain this process as a standalone process but requirements may be integrated in the Location's overall contracting processes and systems.***

Tier	Step	Key Elements
TIER 1	**Contractor's Prequalification and Selection from Safety Aspects**	A procedure for the selection of contractors that includes scrutiny of their past safety performance and safety capabilities sufficient to meet BPCL HSSE policy and propped scope of work;
TIER 2	**Communicating Contract Specific Safety Requirements in Contract Documents (Tendering/ Agreements)**	Develop contract bid documents with clear safety expectations /requirements to be met by contractors;
TIER 3	**Pre Job Meeting &Contractor's Training**	Conduct pre job meetings and provide training (induction and SOP specific)to contractors staff , prior to start of the work;
TIER 4	**Execution of the Work & Performance Monitoring**	Clear arrangements for monitoring the work performance against contract requirements;
TIER 5	**Post Contract Evaluation**	Establish process & procedure for performance evaluation during and post contract

***Note 1**: **For small contracts, and those where the extent of planning work is much less, the need for such a comprehensive coverage may be correspondingly reduced by BU/Locations management**. However, even for small or short duration contracts, safety management must not be ignored or treated superficially. In such cases, the work is likely to include the use of basic practices (e.g. scaffolding, welding, excavating,*

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erecting formwork, etc) and the contractor should be able to demonstrate good general safety management in each of these basic practices.

***Note 2**: BU/Locations may take a decision to apply the all the full approach based on the results of risk assessment .*

6.1. Prequalification & Selection of Contractors

a. BU/ Locations shall develop and maintain a process for pre qualification and selection of contractors relevant to their needs and demonstrate continual improvement of the same.

b. **Prequalification Requirements** : While selecting / pre-qualifying the contractors, consideration shall at least be given to:

A. Contractor's Past Safety Performance

- Worker's Compensation Payout (last 3 yeas)
- Number of Fatal Incidents (last 3 yeas)
- Reportable Lost Time Injury Frequency Rates (last 3 yeas)
- Pending court cases, if any

B. Safety Capabilities Assessment

- Contractor's Company Safety Policy
- Contractor's Company Safety Organization
- Safety Management System Manual of the contractor
- Hazard Identification & Risk Management Program
- Accreditation (ISO 9001/ ISO 14001/ OHSAS 18001)/ Performance Awards
- 3rd Party / Client Audits Report of similar previous jobs undertaken by them

Refer **Appendix 2** for Indicative Checklist of Pre-qualification criteria, which may be considered case to case basis based on nature of the project.

Note 1 :BU/ Locations may finalize the relevant pre qualification criterion based on risk potential level of the proposed job. Refer **Appendix 3** for indicative guidance on risk potential level of different jobs.

Note 2 : For jobs executed, directly by Locations involving labour contractors through approved agencies direct may not require detailed pre qualification criteria as above.

c. Contractors safety pre qualification evaluations shall be performed by a team of designated officials from User's Department Representative ; Procurement, HSSE , Finance etc.

d. Contract department shall maintain a database of competent contractors and their safety pre qualifications information.

6.2. Communicating Contract Specific Safety Requirements in Contract Documents

a. Locations shall determine contract specific safety requirements based on risk level of the proposed job (Refer **Appendix 4**).These Contract Specific Safety Requirements shall be communicated to all pre qualified contractors in bid documents by contracting department.

b. The contract specific safety requirements , which may be included are (but not limited to) :

- **Enlistment/ Registration Letter as** issued by BPCL
- Contractor's safety staffing specific to work at BPCL Location
- Contractor's safety committee details

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- Required safety staffing at BPCL Location and qualifications
- Contractor's HSSE Policy
- Work safety Plan/ Method statements/safe work procedure as relevant and determined by BPCL contract officer-in-charge.
- Job Safety Plan (JSP) for all hazardous or potentially hazardous jobs as identified by BPCL
- List of competent persons for safety critical activities approved by government agencies etc.

c. Each contractors must provide a nominated manager, supervisor or foreman with authority to give and receive safety instructions from BPCL. The recommended guidelines for contractor' safety prescribed below:
   - If a contractor is employing less than 30 employees, he shall designate one dedicated supervisors as a safey steward.
   - For every 30 persons or more contractor shall appoint one qualified safety steward (diploma in industrial safety from recognized government institute). For more than one safety steward, one of them shall be appointed as Chief safety steward.
   - In addition to above contractor shall also appoint one safety officer, if he employs more than 100 workers. Safety officer shall have Diploma in Industrial Safety or any equivalent qualification from Government Recognized Institute and minimum 2 years of experience. For more than one safety officer, one of them shall be appointed as Chief safety steward.

d. Contracting department shall ensure that contractor submit all the applicable safety requirements as listed above. HSSE department shall be consulted if needed.

6.3. Pre Job Meeting and Contractor's Training

A. Pre Job Meeting

a. Each location will implement and maintain a process to communicate with, and train contractors on the specific hazards and requirements in place at the Location.
b. Conduct a pre job meetings with contractors prior to start of the work to communicate specific contract safety requirements.
c. The purpose of the pre-job meeting is to:
   - Provide on-site job orientation for the contractor and to verify the contractor's ability to comply with regulatory and Location's safety requirements specific to the scope of work.
   - Communicate with the contractor regarding the hazards at the job location and for the contractor to communicate any hazards that may be brought into by the contractor.
   - Obtain agreement between Location and the contractor on the safety plan to ensure the work can be safely executed.
d. The pre-job meeting shall be conducted by the **BPCL-User's Department Representative/ Officer -in-Charge**. Participants may include the following depending upon the scope of work, duration of the work, and the relative level of risk associated with the work:
   - Contractor Job Representatives
   - Contractor's safety officer/ stewards
   - Location maintenance representatives
   - Location operations representatives
   - Location HSSE Role Holder
   - Any Other

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e. The contractor shall provide the following documentation for the pre-job review meeting, as applicable:

- Documented Safety Plan, if necessary
- CVs of safety representatives
- A list of portable equipment/tools that the contractor will be bringing on site including the intended service.
- Verification that portable equipment/tools meet integrity requirements
- Inspection records for lifting equipment such as cranes and forklifts.
- Verification that personnel lift equipment is being used as intended by the manufacturer.
- Verification of electrical generating equipment integrity by a certified electrician.
- Verification that pressure equipment meets regulatory standards.
- Craft skills verification.
- Verification that subcontractors are on original proposal and on the HSSE Qualified list.

Refer **Appendix 5** for Checklist of documentation for pre-job review meeting

f. The outcome of pre job meeting shall be documented and record maintained.

B. Training

g. Contractor shall be responsible for all of his employees to receive the Safety orientation prior to beginning the work.

h. Locations shall provide induction training to all contractor's workman and supervisor's prior to start of work . The training shall address:

- An overview of the work place and potential safety risks
- Policies and procedures that address potential safety risks
- Emergency procedures
- Alcohol and drug prohibition policy
- BPCL 12 Life Saving Rules

The training requirements shall conform to OISD-GDN-206 for contract workers and OISD-STD-154 for contractor's supervisors.

i. Duration of contractor's workman induction training shall be minimum 3 hours and supervisors 8 hours. This shall be valid for one year.

j. Induction training shall be conducted prior to start of the work and thereafter at least once a year.

k. The induction training will be provided prior to beginning of work, and as frequently as the Location HSSE role holder deems necessary to ensure the contractors remain aware of these requirements.

l. Each BU- HQ HSSE Role Holders shall develop a centralized E- resources for safety videos to be used by respective locations within their BU in consistent manner.

m. Competency Training - The contractor's shall be responsible for providing competency training related to their subject domain (examples include : Lifting, scaffold, blasting, electrical work, boiler operators, hazardous goods transportation etc) to their personnel and shall provide training certificates from government recognized institutes, prior to start of the work.

n. Necessary training records of contractor employees shall be maintained by concerned function and reviewed by user department.

o. ID cards shall be issued by only after safety orientation participation record and medical fitness certificate and any other requirements prescribed by the Location.

p. Each Location shall develop and maintain a designated contractor's training facilities.

q. The job holders shall provide SOP specific training before start of the work.

r. A new contractor workman shall not be engaged in job specific work unless he

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- has been provided a mentor
- Job specific SOP training is given
- Job is supervised until adequate skills are demonstrated by him.

Refer **Appendix 6** recommended list of facilities for contractors training, each location shall maintain.

6.4. Execution of the Work & Performance Monitoring

a. Contractor employees shall not be permitted to work at the BPCL Locations without formally being given
   - Orientation/induction training on Location safety rules /procedures and Emergency Response Procedures
   - Medical fitness assessment
   - Issue of valid Gate Pass as per Location's notified procedure for persons ,materials and vehicles
   - Without job safety plan and issuance of valid work permit by Location's designated person
   - Possession of the competency certificate if applicable for the specific job
   - Availability of supervisor
   - Fire extinguisher is not available at workplace
   - Personal protective Equipment

b. Daily Job Safety Plan : The Contractor Job Representative shall prepare daily job safety plan to identify specific tasks , their hazards and risks and control measures. This shall be approved by BPCL job owner/ HSSE staff. This is a formal review of all tasks and to be documented.

c. Periodic Inspections : The Location and Contractor Job Rep shall conduct periodic safety field inspections of the physical facilities and work practices, e.g.:
   - Housekeeping
   - Tools and portable equipment
   - PPE usage
   - Scaffolds
   - Excavations
   - Electricals
   - Hot work
   - Lifting

   For major risk activities, the inspection should be done daily. The inspections shall be documented using appropriate checklist.

d. Monthly Safety Performance Data: Major or Serious Risk Potential work contractors shall submit monthly safety performance data to the BPCL representative using the Monthly Contractor Safety form .
   - Total man-hour worked in the month
   - Number of BPCL 12 Life Saving Rule Violations
   - Number of Lost Time Incidents
   - % Attandance in Induction Training
   - Any safety concern

e. Locations shall ensure
   - Availability of First Aid Boxes and a Qualified First Aiders.

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- Arrangement to ensure immediate transportation (Ambulance van) and further treatment to employees, in case of any emergency involving injury etc are in place.

f. Periodic Performance Reviews Periodic performance reviews are conducted for Major or Serious Risk work contractors to review, discuss, and evaluate the contractor's safety performance. This meeting should include the following:

- BPCL User Department Representative/ Designated Job Representative
- Contractor Job Representative
- Contractor Managers
- Contractor safety staff

The following topics are typically addressed:

- Safety performance
- Incident summary
- inspections and follow-up actions
- Safety concerns/ issues
- Opportunities for improvement

6.5. Post-Contract Evaluation

Locations shall conduct a Post-Contract Evaluation. The evaluation shall address:

- Contractor management's safety commitment
- Contractor's execution of the safety plan
- safety performance
- Compliance with regulatory and Location's contract conditions
- Use of proper safety equipment and PPE
- Promptness and effectiveness in implementing corrective actions for identified deficiencies
- Effectiveness of communication to the work force
- Adequacy of pre-job training of contractor employees

The results of evaluation shall be documented .

7.0 Recognition and Disciplinary Policies

BU/Locations shall develop and implement an Safety Recognition Scheme to recognize outstanding safety performance of workers, supervisors and subcontractors. This recognition may be given out on a half yearly or annual basis. BU/Locations shall also develop and implement Safety Discipline Schemes to prevent willful violations. Refer **Appendix 7** for a Sample Schedule of Financial Deterrent for Violation of Safety Norms by Contractors within Operating Locations.

8.0 Review

Corporate -HSSE shall review this technical standard once in 2 years and need based in consultation with BU HSSE Role Holders.

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9.0 Definitions

Item	Definition
BPCL Job Representative	A BPCL employee who has been assigned accountability to interface with the contractor over its fulfillment of its responsibilities under the contract and this program. This individual is designated to be the primary on site job contact for a contractor and to provide daily oversight to assure that the contractor meets applicable safety performance and compliance requirements.
Consultant	Consultant is a physical or legal person/entity engaged by BPCL to provide the contract management services to BPCL for management of the contractors on its behalf .
Contractor Worker	It covers all workmen employed by contract execution agency , who are deployed at BPCL Locations and also includes contractor's supervisor. It also includes casual workers provided by BPCL approved labour contractors .
Consultant	Consultant is a physical or legal person/entity engaged by BPCL to provide the contract management services to BPCL for management of the contractors on its behalf .
Contractor Worker	It covers all workmen employed by contract execution agency , who are deployed at BPCL Locations and also includes contractor's supervisor. It also includes casual workers provided by BPCL approved labour contractors .
Contract Owners	Concerned BPCL's Officer-In-Charge shall be the owner within this definition.
Contractor / Executing Agency	A physical or legal person/entity having contractual obligation with the BPCL, and who deploys one or more worker in the Location.
Designer	Designer is a physical or legal person / entity engaged by to provide design services .
Incident	An incident is an unplanned, uncontrolled, unintended or unforeseen event, caused by unsafe acts and / or unsafe conditions, resulting in or having the potential to result in personal injury and/or property damage.
Owner	BPCL concerned Location Head shall be the owner within this definition.
Owner's Representative	BPCL Officer-in-charge of the contract, who has been designated by the Location Head or Head of User's Department to manage the contract.
Work Location	A place/unit where the job is carried out by contractor/executing agency in specified manner with safety, during construction phase or in operation phase.
Item	Definition
BPCL Job Representative	A BPCL employee who has been assigned accountability to interface with the contractor over its fulfillment of its responsibilities under the contract and this program. This individual is designated to be the primary on site job contact for a contractor and to provide daily oversight to assure that the contractor meets applicable safety performance and compliance requirements.
Consultant	Consultant is a physical or legal person/entity engaged by BPCL to provide the contract management services to BPCL for management of the contractors on its behalf .

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10.0 Abbreviations

BPCL	Bharat Petroleum Corporation Limited
BU	Business Unit
CSM	Contractor Safety Management System
DIR	Detailed Investigation Report
ERDMP	Emergency Response and Disaster Management Plan
HOD	Head of the Department
HSSE	Health, Safety, Security , Environment
IRIS	Incident Reporting and Investigation System
ISO	International Organization for Standardization
IS	Indian Standards
LSR	BPCL 12 Life Saving Rules
LTIFR	Lost Time Injury Frequency Report
LOPC	Loss of primary containment
RLTIFR	Reportable Lost Time Injury Frequency Report
MOC	Management of Change
MIS	Management Information System
OISD	Oil Industry Safety Directorate
SMS	Safety Management System
TS	Technical Standard

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Appendix 1 : Roles and Responsibilities as per OISD Guidelines (GDN-207)

BPCL Location Head

I. To institute a mechanism for identification and compliance of all applicable statutory rules & regulations
II. To provide specific information to contractors and make workers aware on the hazards associated with job assigned.
III. To provide information about Risk Mitigation measures available at the place of work.
IV. To provide the contractor with information on BPCL's Safety Requirements. Safety Plan & Regulations, Emergency Management Plan, lockout/ tag out procedure, confined space entry, work permit systems etc.
V. To specify rules (e.g. for security including access arrangements) and safety rules such as fire protection, first aid arrangements, work permit systems etc.
VI. To provide comprehensive list of statutory regulations / standards and specification, to be complied with during execution of contract, in the tender document itself.
VII. To ensure training of the contractor workforce, medical examination, and proper usage of safety equipment.
VIII. To specify the requirements of Health, Safety and Environment (HSE) (commensurate with the nature of job) in Pre- Qualification criteria.
IX. To designate Contract's Officer-in-charge and safety officer.
X. To arrange for a multi-disciplinary safety audit team to conduct surprise / regular safety audits and monitor the implementation of the recommendations.
XI. To introduce suitable schemes for motivation of the contractor worker to adhere to safety guidelines.
XII. To review safety practices & their implementation through periodic surprise visit of the work Locations and monthly review meeting.
XIII. To develop the HSE plans and incorporate the same in the tender document ,as relevant
XIV. To liaise with external agencies like press, public etc and with law enforcement, regulatory, statutory agencies etc.
XV. To report to statutory agencies on safety compliance and accidents, if any.

BPCL's Officer-in-charge / Representatives

I. The duties & responsibilities of engineer-in-charge shall include:
II. To ensure that all Contract requirements including Health, Safety, Environment & Security are complied with.
III. To ensure that contractor workforce deployed is adequately qualified, trained and in state of health to commensurate with the requirements of the job.
IV. To ensure that the Tools / Tackles and Machinery being used are properly tested and are in sound working conditions and necessary resources proposed for providing safe place of work and necessary PPE are being used.
V. To take the required necessary corrective action immediately upon noticing or receipt of a report on noncompliance or any such condition which poses a threat to health, safety or environment. If during the course of execution of the contract, any situation of non-compliance with the contractor's safety and health plan are noticed / reported, the same will be taken up with the contractor for correction. In the event of repeated non compliance, suitable action to be initiated as per the contract.
VI. To ensure that the incidents are reported to all concerned within stipulated timeframe.

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VII. To ensure submission of a plan for safe working (Method Statement) from contractor and approval of the same by competent person / department.
VIII. To ensure that Work Permit System in line with OISD-STD-105 is adhered to.
IX. To ensure availability of all the documentation needed for the execution of contract.
X. To ensure that the quality controls have been maintained during fabrication/erection and all jobs required for safe commissioning have been carried out.
XI. To ensure safe dismantling of all temporary facilities/connections put up by the contractor, after completion of work.
XII. To compile a report on the safety performance (at the conclusion of each contract or periodically such as annually for renewable and long-term contracts), which is to be considered in future when selecting contractors.
XIII. To ensure that the Consultant, contractor and sub-contractor employ / designate qualified & trained Safety Engineer / Officer commensurate with requirement of the job.

BPCL Safety Officer

The duties & responsibilities of the BPCL's Safety Officer shall include:

I. To assess the hazards associated with jobs in consultation with all concerned and establish safe working procedure including identification of the escape routes.
II. To establish a written record of factors which can cause injuries and illnesses.
III. To undertake routine/surprise inspections of all work Locations and identify unsafe conditions & practices, if any. Check for compliance of the safety practices being followed with approved HSE Plan.
IV. To investigate promptly the incidents (including near-miss) in order to advise corrective and/or preventive action.
V. To maintain statistical information for use in analyzing all phases of incidents and events involving contract personnel.
VI. To provide the means for complying with the reporting requirements for occupational injuries and illnesses.
VII. To check whether the proposed working arrangements are safe and satisfactory.
VIII. To communicate to the Contractor the imposed restrictions which may affect the work/personnel such as the temporary closure of a corridor or electrical isolation of equipment.
IX. To review and monitor the contractor's adherence to approved HSE plan and all applicable environmental, health, and safety requirements.
X. To ensure that Consultant, Contractor’s Managers, Supervisors and workmen at all levels (who will plan, monitor, oversee and carry out the work) undergo Health, Safety and Environmental training in their respective responsibilities with respect to conducting work safely and with due regard for the protection of the environment.
XI. To identify areas of operations where specialized training is required to deal with potential dangers.
XII. To document and to bring to the attention of the Contractor's supervisor and contractor's management any non-compliance/violation of the safety norms against approved safety and health plan or safety and health requirements and also raise these issues in the Safety Committee Meetings.
XIII. To take part in tool box meetings at random and to ensure maintenance of records.

Contract Executing Agency

Duties & responsibilities of the contract executing agency shall include the following:

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I. To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.
II. To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.
III. To nominate qualified & trained Safety Engineers / Officers reporting to the BPCL Officer-in Charge, for supervision, co-ordination and, liaison for the implementation of the safety plan.
IV. Similar HSE Plan should be implemented at the sub- contractor's or supplier's office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.
V. To arrange suitable facilities in liaison with the BPCL's officer-in-charge for drinking water, toilets, lighting, canteen, crèche etc as applicable as per Laws/ Legislation at Location and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.
VI. To arrange for fire protection equipment as per the advice of BPCL's officer-in-charge.
VII. To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the BPCL's officer-in-charge/ Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.
VIII. To comply with all the security arrangements of BPCL.
IX. To ensure that the plant and equipment used at the work place by him / his employees is correctly registered, controlled and maintained in sound working condition.
X. To ensure availability of First Aid boxes and First Aid trained attendant.
XI. To ensure that all incidents including near misses are reported to all concerned immediately.

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub contractors, if employed, should be approved by the BPCL officer-in-charge of the contract. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

Contractor's Supervisor / Safety Officer

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

I. To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.
II. To ensure that required guards and protective equipment are provided, used, and properly maintained.
III. To ensure that tools and equipment are properly maintained and tested.
IV. To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.
V. To ensure that the workers understand the work to be done, the hazards that may be encountered, and the proper precautions/procedure for carrying out the work safely.
VI. To take immediate action to correct any violation of safety rules observed or reported.

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VII. To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), wherever applicable, and provide necessary mitigation measures.
VIII. To ensure inspection and certification of all tools (hand operated as well as mechanically operated) being used. Defective tools shall be immediately removed.
IX. To ensure that appropriate warning signboards or tags are displayed.
X. To ensure that workers have proper training for their job assignments, including use of appropriate PPE and first aid firefighting equipment.
XI. To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.
XII. To ensure that sick and/or injured workers receive appropriate first aid and/or medical attention.
XIII. To report each incident and/or injury in accordance with established procedures and assist in investigation.
XIV. To take necessary action for correction of any unsafe act / condition at the workplace. However, in case the same is outside the limits of authority, it should be reported to BPCL officer-in-charge of the contract immediately.
XV. To conduct daily inspections to ensure compliance with safety standards, codes, regulations, rules and orders applicable to the work concerned.
XVI. To ensure that workers under their supervision are aware of their responsibilities.
XVII. To arrange daily tool box meeting and regular safety committee meetings and maintain records in the required formats. (Refer Clause 5.9.1)
XVIII. To arrange stand-by supervisor/ worker where situations so demand.
XIX. To develop methods and display banners/posters to inculcate safety consciousness.
XX. To attend training and ensure participation of his workers for training as per schedule arranged by the BPCL and keeps himself updated.
XXI. To keep records of number of persons working at the Location.
XXII. To keep a constant liaison with BPCL Officer-in-charge / his representative(s) on safety issues.
XXIII. To maintain accident & near miss record in a register.
XXIV. To ensure that only PPE of the approved type by BPCL is used at Location.

Contract workers

The duties & responsibilities of the contractor worker should include the following:

i) To perform work safely as per the job requirement and instructions.
ii) To inform all concerned regarding unsafe conditions/acts.
iii) To wear PPE as stipulated and necessary for the job.
iv) To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.
v) To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.

Consultant

BU/ Location may appoint a consultant as applicable, based on the respective contract conditions. The primary responsibility of consultant is to ensure compliance with agreed HSE plan for the contract by the Contractor. However those responsibilities conferred on BPCL officer-in-charge of the contract cannot be delegated to consultant.

Where the consultant's scope involves Engineering and Design, those factors under Designer should also be applicable.

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In all cases, the Consultant's scope include submission of HSE plans for work under his and Contractor's purview and implementing the same till job completion. It should conform to BPC's requirements. This should include Guidelines and Implementation and Reporting Methodology to be followed with required report formats.

Adequate number of Safety Officers shall be provided by the Consultant with necessary skills required for the work to be performed.

The Consultant shall review the documents submitted by the contractor and advise BPCL on acceptance as well as advise suitability and number of Contractor's safety officers / supervisors.

Designer

The Process Designer should identify all hazards and risks likely to be encountered during fabrication, erection including dismantling, Pre-commissioning, commissioning and Performance run to meet the Guarantees and advise the risk mitigation measures.

All the hazards and safety measures to be adopted while handling Dangerous chemicals and Catalysts should be detailed by the Process Licensor and the same should be again included in the scope of the suppliers. Specific write ups/MSDS should be obtained from Patented single source suppliers also.

Designs should recognize, include and apply safe practice during preparation, construction and subsequent operational use and maintenance after completion of the Project.

All documents including drawings and calculations are to be originated, checked and approved in accordance with latest international codes, standards, specifications and design basis philosophy.

Preferred use of low risk materials, policy on hazardous substances, preferred use of low noise and dust-suppressed equipment etc. should be encouraged.

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Appendix 2 : Indicative Checklist of Pre-Qualification Criteria

S.No.	Item	Applicability	
		Yes	No
A	**Contractor's Past Safety Performance**		
1	Worker's Compensation Payout (last 3 yeas)		
2	Number of Fatal Incidents (last 3 yeas)		
3	Reportable Lost Time Injury Frequency Rates (last 3 yeas)		
4	Pending court cases, if any		
B	**Safety Capabilities Assessment**		
1	Contractor's Company Safety Policy		
2	Contractor's Company Safety Organization		
3	Safety Management System Manual of the contractor		
4	Hazard Identification & Risk Management Program		
5	Accreditation (ISO 9001/ ISO 14001/ OHSAS 18001)/ Performance Awards		
6	3rd Party / Client Audits Report of similar previous jobs undertaken by them		

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Appendix 3 : Indicative Risk Based Criteria for Contractors Classification

Major Risk Potential	The following types of contractor work are generally considered to be major risk potential: 1. Contractor performing maintenance or repair, turnaround, major renovation, of process equipment or specialty work on or adjacent to a process unit and whose work can impact process safety / fire more than 15 minutes, property loss more than Rs 10 Lacs;. 2. Contractors whose work could result in fatality. Examples include: • Electrical work • Hot work • Height Work • High pressure water blasting • Elevated work • Demolition • Scaffold erection/dismantling • Excavation • Cranes near power lines • Construction • Confined space entry including entries into inert atmospheres • Abrasive blasting • Pressure Testing
Serious Risk Potential	This type of contractor provides general services and support general maintenance. They have low potential of impacting process safety, potential for exposure to significant health risks and high potential for exposure to significant personnel safety risks, e.g.: • Building and grounds (lawn care, painting, janitorial, paving, pest control, canteen, plumbing, etc.) • Inspection • Laborers (stores, reproduction) • Vehicle mechanics Contractors whose work could result in Reportable Lost Time Injuries .
Minor Risk Potential	Contractors providing clerical or technical expertise and knowledge in support of plant and business operations (Technical & Administrative Contractors) generally have minimal exposure to significant safety and health risks. Technical and administrative contractors generally perform their work in an office environment or are escorted by Location representatives while in the operating units.

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Appendix 4: Indicative Contract Specific Safety Requirements Checklist

S.No.	Item	Applicability	
		Yes	No
1	Enlistment/ Registration Letter as issued by BPCL		
2	Contractor's safety staffing specific to work at BPCL Location		
3	Contractor's safety committee details		
4	Required safety staffing at BPCL Location and qualifications Contractor's HSSE Policy		
5	Work safety Plan/ Method statements/safe work procedure as relevant and determined by BPCL contract officer-in-charge.		
6	Job Safety Plan (JSP) for all		
7	hazardous or potentially hazardous jobs as identified by BPCL		
8	List of competent persons for safety critical activities approved by government agencies etc		

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Appendix 5 : Checklist of Documentation For Pre-Job Review Meeting

S.No.	Item	Applicability	
		Yes	No
1	Documented Safety Plan, if necessary		
2	CVs of safety representatives		
3	A list of portable equipment/tools that the contractor will be bringing on site including the intended service.		
4	Verification that portable equipment/tools meet integrity requirements		
5	Inspection records for lifting equipment such as cranes and forklifts.		
6	Verification that personnel lift equipment is being used as intended by the manufacturer.		
7	Verification of electrical generating equipment integrity by a certified electrician.		
8	Verification that pressure equipment meets regulatory standards.		
9	Craft skills verification.		
10	Verification that subcontractors are on original proposal and on the HSSE Qualified list.		

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Appendix 6: Recommended List of Facilities for Contractors Training

- Designated Room with seating arrangements
- LCD projector
- White board and Pens
- PPEs display as required at the Location
- Critical safety sinages display
- Work permit system forms displays
- First aid and emergency contacts display
- Drinking water
- Safety videos*
- Attandance register

Note : Each BU- HQ HSSE Role Holders shall develop a centralized E- resource for safety videos to be used by respective locations within their BU in consistent manner. These may include:

1. Mandatory Safety Orientation Training - At the time of First Entry
2. Work Permit System
3. Confined Space Safety with Self Containing Breathing Apparatus
4. Work at Height Safety
5. Hazardous Chemical Safety
6. Electrical Safety
7. Hot Work Safety
8. Fire Safety
9. First Aid Safety

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Appendix 7: Sample Schedule of Financial Deterrent for Violation of Safety Norms by Contractors within Operating Locations

BHARAT PETROLEUM CORPORATION LIMITED (BPCL), REFINERY

All contractors working inside Refinery have to strictly follow safety norms as per BPCL rules and regulations. Contractors who are violating safety norms while executing the job will be penalized financially. Penalty amount and Reporting Authority for violation / non adherence of various safety norms is given below.

Sr. No.	VIOLATION OF HSE NORMS	PENALTY AMOUNT	REPORTING AUTHORITY
NON ADHERENCE OF WORK PERMIT CONDITIONS			
1	Working without proper Authorization/ Permit (Cold Water)	Rs 6000/- per occasion	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates
2.	Hot work without proper Authorization/ Permit	Rs. 12000/- per occasion and delisting/holiday listing of 3 years if repeated.	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates
3.	Violation of any of the conditions specified in the permit	Rs 2000/- per permit.	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates
4.	Use of mechanically propelled equipment/engine/generator set without/ with faulty spark arrestor	Rs. 1000/- per equipment	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S),

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			Section Head Estates
5.	Non-display of name board, permit etc., at site	Rs 600/- per location where Job is being executed. Penalty will be repeated if not rectified within 3 days.	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates
VIOLATION OBSERVED WHILE WORKING AT HEIGHT			
6	Working at height without safety belt arrangement as required i.e. without safety belt / Non use of double lanyard safety belt.	Rs 1000 / per person	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates
7.	Throwing up/down any material from height or not making proper provision to bring down material safety from height	Rs. 1000/- per occasion	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates
8.	Non standard/unsafe platform/ladder	Rs. 2000/- per case per day	Engineer-in-charge, Head of Dept. F&S, Head of Dept. (Process/PD/Maintenance /MM PL/Tech./CS&S), Section Head Estates

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Bharat Petroleum

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BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Risk Assessment and Management

BPCL/CSMS/TS/02

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Issued By	**GM, Corporate -HSSE**
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1.0 Purpose

BPCL has developed a corporate safety management system (CSMS) which defines specific requirements for managing OHS risks across its operations in accordance to its HSSE policy and stakeholders expectations. The **Element 5 of the Corporate Safety Management System : Risk Assessment and Management** requires that each BPCL facility/location is designed, constructed and operated to reduce the risk exposures to as low as reasonably practicable (ALARP) level in accordance to national and international standards.

This Technical Standard is indented to provide guidance to BU/ Locations on the Safety Risk Assessment and Management Techniques. **This TS set out a generic framework for establishing the context, identifying, analyzing, assessing , treating, monitoring and communicating Risks.** Risk Assessment Methodologies, Techniques, Guidelines, Formats etc. given in this TS are for guidance purpose.

Note : BU and Locations may develop and detail their own risk assessment and management program/ procedures based on their operations/activities and in accordance to applicable legislation.While doing so,they may judicially use techniques as specified in this TS.

The requirement and practices indicated in the TS does not intend to replace any national or local legislation and should be complied by BPCL Locations.In case of any conflict, local laws shall prevail.

2.0 Applicability

The standard applies to the all BUiness Units (BU) and operating Locations of BPCL.

3.0 References

BPCL HSE Policy

BPCL Corporate Safety Management System

The Petroleum and Natural Gas Regulatory Board (Codes of Practices for Emergency Response and Disaster Management Plan (ERDMP)) Regulations, 2010

IS 15656: (2006) Hazard Identification and Risk Analysis--Code of Practice

Occupational Health and Safety Assessment Series (OHSAS 18001:2007)

ISO 31000:2009 Ed.1.0 - Risk management : Principles and guidelines on implementation

Guidelines for Hazard Evaluation Procedures - published by Center for Chemical Process Safety (CCPS),USA (https://www.aiche.org/ccps)

HAZOPs and Revalidation Safety Studies - Best Practice and Industry Guidelines (http://www.icheme.org)

4.0 Roles and Responsibilities

Corporate HSSE shall be responsible for developing and updating this standard to ensure its continued relevance to BPCL.

BU/ Locations shall establish and implement a **documented risk assessment and management program** as uitable to their risk levels. This program ,however, should :

a. Ensure that risk management is embedded in the Location's safety culture and managemnt system;
b. Ensure risk assessment is conducted in all project activities design, construction, operation, maintenance and decommissioning stages;
c. Define risk management methodologies and competencies;

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d. Be based on consultation with employees, contractors and other relevant stakeholders;
e. Incorporate the recognized steps of risk management, which shall include:
   - Identifying all health and safety hazards in the workplace;
   - Assess the risks of these hazards;
   - Formulate control measures to reduce the risk to an acceptable and as low as reasonably practicable (ALARP) level;
   - Review the program on a regular basis; and
   - Incorporate a management of change process within the location.
   - Consider routine and non-routine activities of all persons having access to the workplace;
   - Consider supply chain and contractor undertakings;
   - Consider human behavior;
   - Identify hazards outside the workplace capable of adversely affecting the environment and/or health and safety of employees;
   - Address potential risk to persons not in the locations's employment, surrounding communities;
   - Address plant, machinery, equipment, substances and materials at the workplace;
   - Address the design of work areas, processes, work organization and operating procedures; and
f. Ensure documentation, recording and communication of the results of risk management activities.

5.0 Training and competency

Each location shall maintain a trained and certified cader of officials in Risk Assessment and Management. The training shall include intensive exposure to up-to-date risk assessment techniques at various project stages (i.e. planning, construction and operation) . The common techniques are HAZID/ HAZOP/ QRA / hazard identification and risk assessment processes to support the implementation of safety management system. The recommended duration of the training is minimum 3 days and should include a qualification examination at the end of the training programme/course.

Each location shall designate custodians to maintain the Risk Assessment Documentation Studies and Documented Register for Hazard Identification and Assessment.

5.1. BPCL Risk Management Framework

Risk assessment is the overall process of risk identification, risk analysis, and risk assessment. Risks can be assessed at an organizational level or a departmental level for projects, individual activities, or specific risks. Different tools and techniques may be appropriate in different contexts. Risk assessment provides an understanding of risks, their causes, consequences, and their probabilities.

The **Figure 1** below provides an illustrative view of BPCL Risk Assessment & Management Framework as applicable to all project stages namely

1 Planning / Design & Engineering (including management of change)
2 Construction and Commissioning
3 Operation & Maintenance
4 Decommissioning and asset disposal

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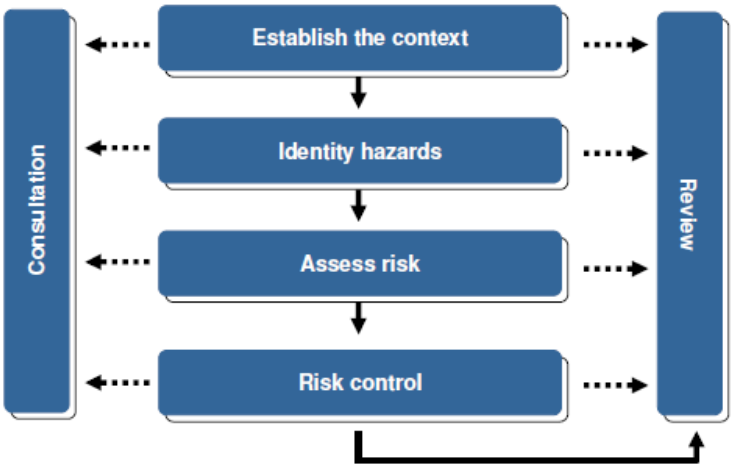

Figure 1 : **BPCL Risk Assessment & Management Framework**

Risk management framework comprises with following steps:

Step 1: Establish the Context / Scope for Risk Assessment

Step 2: Identify Hazards

Step 3: Risks Assessment

Step 4: Risk Control

Step 5: Consultation & Review

5.2. Establish the Context/Scope

a. The first step in risk assessment and management process is to define the purpose, scope , cost and time frame within which this need to be completed.

b. Consideration should be given to the following inputs while finalizing context/scope

- Identify the project stage ;
- Applicable legal/regulatory requirements;
- stakeholder expectations, and any relevant social, cultural, political, financial, technological, economic, or competitive factors;
- List of Activities / facilities to be covered under risk assessment;
- List of chemicals and maximum storage quantities involved.

c. While establishing the context ,careful consideration should be given to the selection of the specific or combination of risk analysis/ techniques , since each have their own individual strength and weaknesses.

d. BU/ Locations may refer **Appendix 1** for Guidance on Selection of Risk Assessment Techniques at relevant Project Stage.

5.3. Hazard Identification

a. BU/Locations shall ensure that hazards are identified and that procedures are in place and are used to identify, assess and control hazards:

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- Before setting up and using a workplace;
- When planning work processes;
- Before installing, commissioning or erecting plant;
- Whenever changes are made to:
  – The workplace;
  – The system or method of work;
  – The process flow diagram;
  - The Piping and Instrumentation Diagram
  – The chemicals used;
  - During Management of Change Procedures as per BU definitions;
- Whenever new information regarding work processes becomes available.

b. To ensure consistency in hazard identification, BU shall develop a hazard prompt list as a reference tool for RA team members (Refer **Appendix 2** for An Example of Hazard Identification List for Guidance). When identifying hazards, the Team should also consider if the hazards could cause harm beyond their immediate area of the work or premises.

c. Hazard Identification should always be conducted by a team of trained officials representing various functions.

d. The common **categories of safety hazards**, which shall be considered by risk assessment team in hazard identification process are:

- Chemical
- Physical
- Mechanical
- Electrical
- Radiations/Electromagnetic
- Natural
- Environmental
- External
- Behavioural
- Biological
- Ergonomic

e. Hazard Identification process shall also look into various process safety information, records/ documentation, site assessment , interaction with concerned personnel

5.4. Risk Analysis and Assessment

a. The main objectives for carrying out a risk assessment is to ensure that human health, assets, and the environment are protected, and that the necessary resources are allocated in a prioritised and defensible manner to ensure that any unacceptable risks identified will be reduced to acceptable levels.

b. Risk Analysis should be carried out as early as possible i.e. planning and engineering stage as layout, storage capacities, process chemistry, equipment specifications , process flow sheet or piping and instrumentation diagram are available.

c. The following are the primary risk analysis techniques, BU / Locations should apply at planning and engineering phase, since these are the most accepted and widely used techniques to capture the causes and consequences of any unplanned event.

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1 Hazard identification (HAZID) Studies
2 Hazard & Operability (HAZOP) Studies

d. Quantitative Risk Assessment using Computer Software Programmes as approved /recognized by Regulatory Agencies.

e. BU/Locations shall ensure that the most recent, sufficient and reliable process safety information data is considered by risk assessment team.

f. These studies shall be done by a multidisciplinary team representing location functions (operation, maintenance, technical, instrumentation, HSSE and quality assurance personnel). BU and corporate representatives should be involved as decided by team leader/ installation head.

g. Refer **Appendix 3** for Guidance Note on HAZOP.

h. Refer **Appendix 4** for Guidance Note on QRA.

i. BU/Locations may also consider the application of other risk analysis techniques in combination to HAZOP and QRA in cases of high risk credible scenarios or as recommended by regulations. ***Appendix 5*** provides brief introduction to these risk analysis techniques. However use of IS 15656: 2006 for detailed guidance on selection of other risk assessment techniques is recommended.

j. BU/Locations shall ensure that the methodologies for above studies confirm to IS 15656: 2006 ; ERDMP Regulations,2010 or applicable OISD standards and other International Standards / Guidelines.

k. BU/Locations shall decide the Risk Acceptance or ALARP Criteria based on the management decisions.

l. BU /Locations shall conduct qualitative risk assessment (typically referred as Hazard Identification and Risk Assessment) at construction, commissioning, operation & maintenance, and decommissioning stages of the project. Wherever required, BU/Locations may also use HAZOP, QRA or other process hazard analysis techniques at operation and other stages of the project from process safety perspective or need.

m. Risk is defined as the product of the measure of the (probability of an occurrence) of safety & health hazard and the potential adverse effects (severity of consequences) that this event may have on people, property and reputation.

Risk = Consequence Score x Probability of Occurrence

n. The Appendix 6 defines BPCL Risk Assessment Matrix (RAM). This provides Guidance on determining probability (P), consequence (C) and risk level. With the probability and consequences known, the risk can be determined by multiplying the “P” and “C” columns. While determining the probability of occurrence of hazard, existing control measures & their strength /effectiveness shall also be considered.

o. The Risk Assessment Matrix is intended to standardizes risk assessment within BPCL.BU may adopt the above RAM or develop their own 5×5 matrix for use at their respective Locations.

p. The consequence should be determined considering the impact on people, process safety and possible extent of asset / property damages.

q. Safety and Health Risks may be categorized into four levels and indicated as a distinct colour code as below:

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COLOUR	RISK	REQUIREMENT
RED	Extreme	Activity or industry should not proceed in current form
BEIGE	High	Activity or industry should be modified to include remedial planning and action and be subject to detailed Assessment
YELLOW	Moderate	Activity or industry can operate subject to management and / or modification
GREEN	Low	No action required, unless escalation of risk is possible

a. The low and moderate risks shall be considered as **Acceptable Risks (ALARP),** whereas high & extreme risks shall be considered as Unacceptable risks and require application of control measures.

b. Locations shall demonstrate that risks are reduced to "as low as reasonably practicable" level via means of single or combination of prevention, mitigation or recovery measures, as appropriate.

5.5. Risk Control

a. If this residual risk is assessed as "Extreme" or "High" additional control measures will be identified and implemented to bring the risk to at least to ALARP level as per Risk Assessment Matrix.

b. Risk Management measures should follow this hierarchy:
- Elimination of the hazard, e.g., adoption of an alternative activity,
- Prevention of incidents (i.e. reduction of the probability of occurrence)
- Control of incidents (i.e. limit the extent and duration of a hazardous event)
- Mitigation of the effects (i.e. reduce the consequences / effects).

The hierarchy of Risk Management include:

Order No.	Control	Example
Firstly	Eliminate	Removing the hazardous piece of equipment out of service.
Secondly	Substitute	Replacing a hazardous substance or process with a less hazardous one, eg substituting a hazardous substance with a non-hazardous substance.
Thirdly	Isolation	Isolating the hazard from the person at risk, eg using a guard or barrier.
Fourthly	Engineering	a. Redesign a process or piece of equipment to make it less hazardous. b. Improved process safety c. Interlocks/trips,ESDs,PRDs, Remote Operate Valves d. Secondary containment e. Fire and Gas Detection and alarm systems f. Fire Control Engineering Hardware/ Hydrants/Sprinklers/ Deluge systems etc. g. Escape and rescue equipment/ facilities
Fifthly	Administrative	Adopting safe work practices or providing appropriate training, instruction or information, Emergency procedures
Sixthly	Personal Protective Equipment	The use of personal protective equipment

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c. Elimination of the hazard should always be first choice, followed by preventative measures, such as using inherently safer design, engineering , lay out, inventory control or adopting safe operating procedures. The use of appropriate PPE, while important and mandatory should always be considered as a last control /choice.
d. Measures to recover from incidents should be provided based on risk assessment and should be developed taking into account possible failures of the control and mitigation measures. Based on the findings of the evaluation, detailed health, safety and environmental objectives and management programmes should be set at appropriate levels.

e. When the risk is categorized, the management shall identify the corrective action in order to manage the hazard at an acceptable and "as low as reasonably practicable" (ALARP) risk level. For hazard with low risk, actions may not be required.

5.6. Consultation and Review

a. Officers /First line supervisors should be consulted on hazard identification and risk assessments to integrate their concerns.
b. Risk Records shall always be maintained as the LIVE Documents.
c. Recordkeeping is essential for effective Risk Management through identifying the responsibilities, setting target dates tracking the recommendations, implementation follow-up, close-out etc.
d. Following are the recommended methods for Risk Management Record keeping
   - HAZOP / HAZID Recommendations & Close-out Sheets
   - QRA Close Out Sheets
   - Hazard & Risk Register (typically referred as HIRA)
e. BU should prescribe hazard identification and risk assessment template/ Format for use at their respective Locations to ensure uniformity.
f. Completed Risk Assessment Records/ Work Sheets shall be approved by the Section Head/ Head of Department , where the risk is being assessed.
g. Designated persons shall be identified to implement the recommended risk control measures.
h. Locations shall develop a system of review risk assessments in specific circumstances such as

   - When a significant change (i.e. change of process, project, legislation, etc. as defined in Location's management of change procedures) is introduced;
   - after an incident;
   - if better information becomes available;
   - A new legislation/information is introduced.

i. HAZOP & QRA studies should be reviwed at periodic intervals (at least once in 5 years).
j. HIRA studies are recommended to be pro actively reviwed once in two years.
k. Records of the hazard and risk management process shall be complete and kept up-to-date; they shall be accessible to and understood by the supervisors responsible for operational decisions.
l. Locations shall ensure that a system is in place to ensure that all recommendations and actions arising from hazard and risk.

5.7. Communication

a. The line manager who oversees the area, function or activity where the risks exist shall ensure that all persons exposed to the risks are informed of:
   - The nature of risks;

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- Any measures or SOP/SWP implemented; and
- The means to minimise or eliminate the risks

b. The line manager shall ensure that regular inspections and process audits are carried out to ensure that risk control measures have been implemented and are functioning effectively.

6.0 Review

Corporate -HSSE shall review this technical standard once in 2 years and need based in consultation with BU HSSE Role Holders.

7.0 Definitions

Accident	A specific unplanned event or sequence of events that has undesirable consequences.
AIChE	American Institute of Chemical Engineers
ALARP	As low as reasonably practicable.
As Low As Reasonably Practicable	Means to reduce a risk to a level that is as low as reasonably practicable and involves balancing reduction in risk against the time, trouble, difficulty and cost of achieving it.
BLEVE	A boiling liquid expanding vapour explosion is typically the result of fire engulfing a pressure vessel containing volatile flammable liquid. When the vessel fails the remaining contents burn in an intense fireball.
Consequence	A measure of the expected effects of an incident.
Consequence Analysis	The study of the possible extent of harmful effects of potential incidents, e.g. calculation of the size of the flammable region of a vapour cloud following a spill.
CCPS	Center for Chemical Process Safety (https://www.aiche.org/ccps)
Deviation	Where a process or procedure does not work as intended.
Explosion	A sudden release of energy characterized by accompaniment of a blat wave
Frequency	The number of occurrence on event per unit of time.
Fault Tree	Logic diagram describing all the potential causes and event chains that lead to a specific incident scenario termed the top-event.
Fire	A process of combination characterized by heat or smoke or flame or any combination of these.
Hazard	An object, physical effect or condition with the potential to harm people,

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	property, the environment or company reputation. **(Note : OHSAS 18001: 2007 -** source, situation or act with a potential to cause human injury or ill health or combination of these).
Incident	An event or chain of events which has caused or could have caused fatality, injury, illness, and/or damage (loss) to assets, the environment, company reputation or third parties. **(Note :** An incident where no injury, fatality or ill health has occurred , may also be referred as Near Miss, Close Call, near ht or dangerous occurrence).
IChemE	Institute of Chemical Engineers U.K. (http://www.icheme.org)
Likelihood	The state of being likely or probable: probability A probability or chance of something The probability of an event or situating taking place.
Major Accident	Major accident as defined in ERDMP Regulations,2010 / MSIHC Rules
Major Accident Hazard or Major Hazard	A hazard that has the potential to result in a 'Major Accident'
Probability	An expression for the likelihood of occurrence of an event or an event sequence during an interval of time or the likelihood of the success or failure of an event on test or on demand.
Quantitative Risk Assessment	QRA provides a structured approach to assessing the potential for incidents and expressing this potential numerically. In QRA statistical values are derived for potential loss of life and damage to resources and environment. *Note: These values should not be interpreted as unavoidable and acceptable losses.* *It should always be recognized that the calculated fatality (or loss) figures are based on experience, statistical failure and incident rates representing an average historical quality of management. QRA is a tool which helps to translate this hindsight into foresight (planning) in order to assist management in deciding the best approach and show ways and means (eg improved engineering, procedures, supervision, etc) to prevent the potential incidents from happening. QRA is not to be used to justify or encourage risk taking.*
Risk	Risk = Consequence Score x Probability of Occurrence. **(Note : OHSAS 18001: 2007** combination of the likelihood of an occurrence of a work-related hazardous event or exposure(s), and the severity of injury or ill

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	health that can be caused by the event or exposures).
Risk Analysis	An imprecise term which infers the quantified calculation of probabilities and risks without taking any judgments about their relevance.
Risk Assessment	The process of determination of risk, usually in a quantitative or semi-quantitative manner. It is an evaluation of the likelihood of undesired events and the likelihood of harm or damage being caused together with the value judgments made concerning the significance of the results. Note the difference between Risk Assessment and Task Risk Assessment in this Guidance.
Scenario	An idealized description of a potential incident.
Uncontrolled Occurrence	An event that escalates, or has the potential to escalate, so that it is beyond the normal span of operations over which control can be exercised.

8.0 Abbreviations

API	American Petroleum Institute
ANSI	American National Standard Institute
ALARP	As Low As Reasonably Practicable
BPCL	Bharat Petroleum Corporation Limited
BU	Business Unit
DIR	Detailed Investigation Report
ETA	Event tree Analysis
ERDMP	Emergency Response and Disaster Management Plan
FEED	Front-End Engineering Design
FTA	Fault Tree Analysis
FMEA	Failure modes and effects analysis
HSSE	Health, Safety, Security , Environment
HAZOP	Hazard and Operability Analysis
HIRA	Hazard Identification and Risk Assessment
IRIS	Incident Reporting and Investigation System
ISO	International Organization for Standardization
IS	Indian Standards

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IR	Individual Risk
IPRA	Individual Risk Per Annum
ISO	International Standards Organization
JSP	Job Safety Plan
KPI	Key Performance Indicator
LTIFR	Lost Time Injury Frequency Report
LSIR	Location Specific Individual Risk
LOPA	Layers of Protection Analysis
LoPC	Loss of Primary Containment
MoPNG	Ministry of Petroleum and Natural Gas
MOC	Management of Change
MAH	Major Accident Hazard
MIS	Management Information System
NFPA	National Fire Prevention Association
NGOs	Non-Governmental Organizations
OISD	Oil Industry Safety Directorate
RLTIFR	Reportable Lost Time Injury Frequency Rate
OHS	Occupational Health Services
OHSA	Occupational Health and Safety
PRD	Pressure Relief Device
P & ID	Piping & Instrument Diagram
PFD	Process Flow Diagram
PHAST	Process Hazards Analysis Software Tool
QMS	Quality Management System
QRA	Quantitative Risk Assessment
RP	Recommended Practice
RAM	Risk Assessment Matrix
SDS	Safety Data Sheet (earlier used as MSDS)
SMS	Safety Management System
SWP	Safe Work Procedure / Standard Operation Procedure

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SIL	Safety Integrity Level Assessment
TS	Technical Standard
WPS	Work Permit System

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Appendix 1 : Application of Risk Assessment Techniques Vis a Vis Project Stage

***Indicates- Mandatory Risk Analysis Tools.**

Note : BU/Locations may also consider the application of any other risk analysis techniques in combination to **Mandatory Risk Ananalysis Tools** in cases of high risk credible scenarios or as recommended by regulations. The use of IS 15656: 2006 for detailed guidance on selection of other risk assessment techniques is recommended.

Project Stage	HAZARD IDENTIFICATION OR RISK MANAGEMENT PROCESS	RECOMMENDED RISK ASSESSMENT TECHNIQUE FOR USE
FOR NEW INSTALLATIONS, ACTIVITIES, PRODUCTS AND SERVICES		
Conceptual Design	Preliminary risk evaluation and management exercise as part of new project feasibility process.	▪ **HAZID*** ▪ Hazard Indices ▪ Preliminary Hazard Analysis ▪ What-if Analysis ▪ Checklists
Engineering Design (Front End & Detailed)	Increasingly detailed safety risk evaluation and management process in accordance with applicable legal requirements such as ERDMP Rules, EIA Rules, OISD Requirements , MSIHC Rules etc.	▪ **HAZID (update)*** ▪ **HAZOP*** ▪ **Quantitative Risk Assessment (QRA)* - Software Based *(Such as latest version of DNV PHAST/ SAFETI or Equivalent simulation software as accepted by Regulatory agencies)*** ***Note 1 : For New Projects, Software Based HAZOP shall be preferred.*** ***Note 2 :*** *BU/ Locations may use other techniques as may also be necessary such as Failure Mode Effect Analysis (FMEA) , Event tree Analysis(ETA), Fault Tree Analysis (FTA), Safety Integrity Level Assessment (SIL) etc .*
FOR EXISTING INSTALLATIONS, ACTIVITIES, PRODUCTS AND SERVICES		
Operation	Conduct comprehensive safety risk assessment and management on all existing facilities, activities, products and	▪ HAZID ▪ **Activity based Hazard Identification and Risk Assessment (HIRA)* -**

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	services.	**Register of Hazard Identification and Risk Assessment** ▪ What if Analysis ▪ Checklists
Periodic Review	Periodic review in accordance with periods defined.	▪ **HAZID (update)*** ▪ **HAZOP Review (Once in 5 years)** ▪ **Quantitative Risk Assessment (QRA)*-** (Once in 5 years)- Software based)
Management of Change	MoC Processes	Note : Use any one or more of the technique as a minimum ▪ HAZID ▪ HAZOP ▪ QRA- Software based ▪ HIRA
Work Permit System	All activities as covered under **work permit** system of the location	Note : Use any one or more of the technique as a minimum ▪ HIRA ▪ **JSP***
DE-COMMISSIONING & ASSET DISPOSAL		
De-Commissioning & Asset Disposal	Conduct comprehensive risk evaluation and management for facilities, activities, products and services that will be decommissioned	Note : Use any one or more of the technique as a minimum ▪ HAZID ▪ HIRA ▪ HAZOP
GENERAL		
Tendering / Procurement	Initiate Risk Evaluation and management as part of the contract phase involving planning and invitation to tender	▪ Technique as per need
Construction	Apply hazard and risk assessment in order to manage the risk associated with any potentially hazardous activities and jobs	▪ HIRA

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Appendix 2 : An Example of Hazard Identification List

No.	HAZARD DESCRIPTION
H-01	**Hydrocarbons**
H-01.01	Crude oil under pressure
H-01.02	Hydrocarbons in formation
H-01.03	LPGs
H-01.04	LNGs
H-01.05	Condensate, NGL
H-01.06	Hydrocarbon gas
H-01.07	Crude oil at low pressure
H-01.08	Wax
H-01.09	Coal
H-02	**Refined Hydrocarbons**
H-02.01	Lube and seal oil
H-02.02	Hydraulic oil
H-02.03	Diesel fuel
H-02.04	Aviation fuel, petrol
H-02.05	Grease
H-03	**Other Flammable Materials**
H-03.01	Cellulosic materials
H-03.02	Pyrophoric materials
H-03.04	Carbon fibre reinforced material
H-03.04	Dry vegetation
H-04	**Explosives**
H-04.01	Detonators
H-04.02	Conventional explosives
H-04.03	Perforating gun charges
H-04.04	Explosive gases
H-05	**Pressure Hazards**
H-05.01	Bottled gases under pressure
H-05.02	Water under pressure
H-05.03	Non hydrocarbon gas under pressure in pipeworks
H-05.04	Air under high pressure
H-05.05	Hyperbaric operations
H-05.06	Decompression
H-06	**Hazards Associated with Differences in Height**
H-06.01,2	Personnel at height
H-06.03	Overhead equipment
H-06.04	Personnel under water
H-06.05	Personnel below grade
H-07	**Objects under Induced Stress**
H-07.01	Objects under tension
H-07.02	Objects under compression
H-08	**Dynamic Situation Hazards**
H-08.01	On land transport (driving)
H-08.02	On water transport (boating/rig moves)
H-08.03	In air transport (flying)
H-08.04	Boat collision hazard
H-08.05	Equipment with moving or rotating parts
H-08.06	Use of hazardous hand tools
H-08.07	Use of knives, machetes etc
H-08.08	Transfer from boat to quay
H-09	**Environmental Hazards**
H-09.01	Weather
H-09.02	Sea state/river currents
H-09.03	Tectonic activity
H-10	**Hot Surfaces**
H-10.01	Process piping equipment 60-150°C
H-10.02	Piping equipment > 150°C
H-10.03	Engine & turbine exhaust systems
H-10.04	Steam piping
H-11	**Hot Fluids**
H-11.01	Temperatures 100-150 °C
H-11.02	Temperatures >150 °C
H-12	**Cold Surfaces**
H-12.01	Process piping -25 to -80°C
H-12.02	Piping equipment < -80°C
H-13	**Cold Fluids**
H-13.01	Oceans, seas & lakes < 10°C

No.	HAZARD DESCRIPTION
H-14	**Open Flame**
H-14.01	Heaters with fire tube
H-14.02	Direct fired furnaces
H-14.03	Flares
H-15	**Electricity**
H-15.01	Voltage > 50 - 440V in cables
H-15.02	Voltage > 50-440V in equipment
H-15.03	Voltage > 440V
H-15.04	Lightning discharge
H-15.05	Electrostatic energy
H-16	**Electromagnetic Radiation**
H-16.01	Ultraviolet radiation
H-16.02	Infra red radiation
H-16.03	Microwaves
H-16.04	Lasers
H-16.05	E/M radiation: high voltage ac cables
H-17	**Ionising Radiation - Open Source**
H-17.01	Alpha, Beta - open source
H-17.02	Gamma rays - open source
H-17.03	Neutron - open source
H-17.04	Naturally occurring ionising radiation
H-18	**Ionising Radiation - Closed Source**
H-18.01	Alpha, Beta - closed source
H-18.02	Gamma rays - closed source
H-18.03	Neutron - closed source
H-19	**Asphyxiates**
H-19.01	Insufficient oxygen atmospheres
H-19.02	Excessive CO_2
H-19.03	Drowning
H-19.04	Excessive N_2
H-19.05	Halon
H-19.06	Smoke
H-20	**Toxic Gases**
H-20.01	H_2S, sour gas
H-20.02	Exhaust fumes
H-20.03	SO_2
H-20.04	Benzene
H-20.05	Chlorine
H-20.06	Welding fumes
H-20.07	Tobacco smoke
H-20.08	CFCs
H-21	**Toxic Liquids**
H-21.01	Mercury
H-21.02	PCBs
H-21.03	Biocides
H-21.04	Methanol
H-21.05	Brines
H-21.06	Glycols
H-21.07	Degreasers
H-21.08	Isocyanates
H-21.09	Sulphanol
H-21.10	Amines
H-21.11	Corrosion inhibitors
H-21.12	Scale inhibitors
H-21.13	Liquid mud additives
H-21.14	Odorant additives
H-21.15	Alcoholic beverages
H-21.16	Recreational drugs
H-21.17	Used engine oils
H-21.18	Carbon tetrachloride
H-21.19	Grey and/or black water

SAMPLE HAZID CHECKLIST

No.	HAZARD DESCRIPTION
H-22	**Toxic Solids**
H-22.01	Asbestos
H-22.02	Man made mineral fibre
H-22.03	Cement dust
H-22.04	Sodium hypochlorite
H-22.05	Powdered mud additives
H-22.06	Sulphur dust
H-22.07	Pig trash
H-22.08	Oil based muds
H-22.09	Pseudo oil based muds
H-22.10	Water based muds
H-22.11	Cement Slurries
H-22.12	Dusts
H-22.13	Cadmium compounds & other heavy metals
H-22.14	Oil based sludges
H-23	**Corrosive Substances**
H-23.01	Hydrofluoric acid
H-23.02	Hydrochloric acid
H-23.03	Sulphuric acid
H-23.04	Caustic soda
H-24	**Biological Hazards**
H-24.01	Poisonous plants
H-24.02	Large animals
H-24.03	Small animals
H-24.04	Food borne bacteria
H-24.05	Water borne bacteria
H-24.06	Parasitic insects
H-24.07	Disease transmitting insects
H-24.08	Cold & flu virus
H-24.09	HIV
H-24.10	Other communicable diseases
H-25	**Ergonomic Hazards**
H-25.01	Manual materials handling
H-25.02	Damaging noise
H-25.02	Loud, steady noises >85dBA
H-25.03	Heat stress
H-25.04	Cold stress
H-25.05	High humidity
H-25.06	Vibration
H-25.07	Work stations
H-25.08	Lighting
H-25.09	Incompatible hand controls
H-25.10	Awkward location of workplaces and machinery
H-25.11	Mismatch of work to physical abilities
H-25.12	Mismatch of work to cognitive abilities
H-25.13	Long and irregular working hours/shifts
H-25.14	Poor organisation and job design
H-25.15	Work planning issues
H-25.16	Indoor climate
H-25.17	Language barriers
H-26	**Psychological Hazards**
H-26.01	Living on the job/away from family
H-26.02	Working and living on a live plant
H-26.03	Post traumatic stress
H-27	**Security Related Hazards**
H-27.01	Piracy
H-27.02	Assault
H-27.03	Sabotage
H-27.04	Crisis
H-27.05	Theft, pilferage
H-28	**Use of Natural Resources**
H-28.01	Land take
H-28.02	Water
H-28.03	Air
H-28.04	Trees, vegetation
H-28.05	Gravel
H-29	**Medical**
H-29.01	Medical unfitness
H-29.02	Motion sickness
H-30	**Hazardous Goods**
H-30.01	Dangerous goods in transport activities

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Appendix 3 : Guidance Note on Hazard Operability Study (HAZOP)

1. Introduction

The HAZOP is aimed at identifying intrinsic hazards and operability related problems associated with the process/utility systems. It will be used to identify all possible causes of deviation from normal safe operation that could lead to any safety and fire hazard, environmental risk or operability problems.

The basic methodology will be to divide the Final Piping & Instrumentation Diagrams into discrete nodes using line by line /vessel-by-vessel approach. For each node, every parameter /guideword deviation will be considered. For each deviation, probable causes will be identified and for each cause, possible consequences will be determined. After considering existing protection or safeguards against each hazardous consequence, recommendations for actions will be made if the remaining level of risk is considered unacceptable.

2. HAZOP Uses

Usage HAZOP is best suited for assessing hazards in facilities, equipment, and processes and is capable of assessing systems from multiple perspectives:

Design

- Assessing system design capability to meet user specifications and safety standards
- Identifying weaknesses in systems

Physical and operational environments

- Assessing environment to ensure system is appropriately situated, supported, serviced, contained, etc.

Operational and procedural controls

- Assessing engineered controls (ex: automation), sequences of operations, procedural controls (ex: human interactions) etc.
- Assessing different operational modes – start-up, standby, normal operation, steady & unsteady states, normal shutdown, emergency shutdown, etc.

3. Methodology for HAZOP Study

Steps involved in HAZOP Study are as follows:

1. Select the node (line, equipment or a system) on the P&ID;
2. List of intention & process parameters for the node;
3. Apply first deviation;
4. Brainstorm various causes of the deviations;
5. Determine the consequences of the deviations;
6. Determine the severity, likelihood and risk of the consequence;
7. Identify Safeguards already provided in the system
8. Suggest recommendations / actions should the safeguards be inadequate;
9. Repeat steps from one (1) to Eight (8) on the next node until all the nodes are covered.

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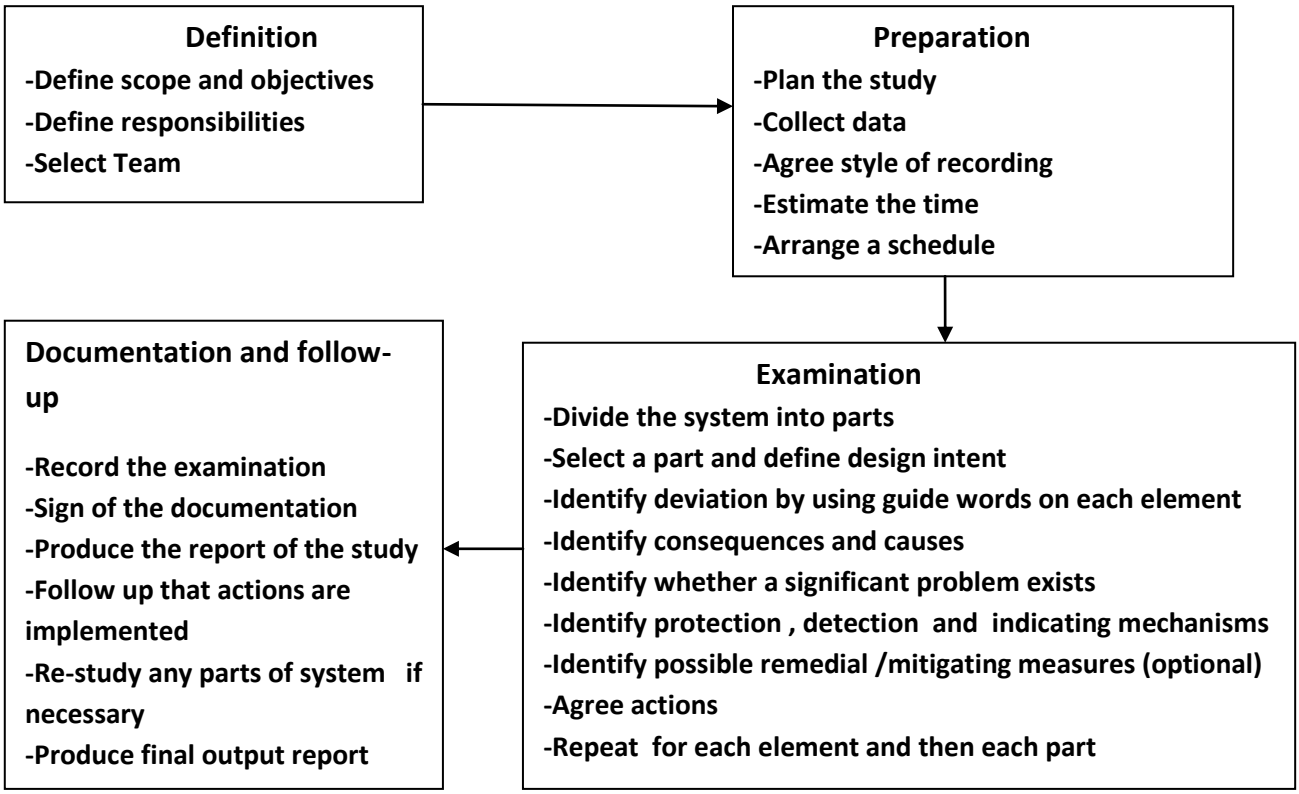

4. HAZOP Team

The study should be performed by a team of people who are familiar with facilities design and operation, working under the guidance of a leader who is experienced in the use of the HAZOP method. General guidelines for composition of a typical HAZOP team are mentioned below:

- A team typically contains 6 to 8 people;
- The overall composition of the team can vary according to the objectives and scope of the study;
- The team must be multi-disciplinary;
- The team should comprise representatives from all groups involved (e.g. design/technology, project/construction and operations);
- Team members should be selected for their knowledge of the process (design engineer) and/or ability to make a technical contribution (e.g. instrumentation engineer);

The team should have a positive and constructive attitude towards the study. For a HAZOP, the team should typically comprise of:

- HAZOP Facilitator (may be a consultant);
- HAZOP Scribe (may be a consultant);
- Process Engineer;
- Control systems/Instrumentation Engineer, if required;
- Operations Representative;
- Maintenance Representative;
- Vendor representatives (Design Engineer and/or Project Engineer) if applicable;
- HSSE representative.

5. Pre requirements

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Following information/ document's (not limited)shall be required during HAZOP Study:

- Process Description;
- Plot Plan;
- Process and utility plant operating envelopes giving design conditions and extremes of flow rates, chemical compositions and other operating conditions;
- Design philosophies e.g. Manning, operating, maintenance, safety, shutdown, emergency control etc.;
- Hazardous Area Classification;
- Location of ESD valves, relief / blow down valves, deluge valves etc.;
- Process Flow Diagrams;
- Piping & Instrumentation Diagrams;
- Hazardous inventories and MSDS.
- Loss Prevention Philosophy;
- Equipment list;
- Datasheets;
- Cause & Effect Charts;
- Piping & Instrumentation Diagrams;

6. HAZOP Guidewords

The lists the guidewords (made of a parameter and a deviation) that are relevant for the facility and that can be used during the HAZOP workshop:

Table: Example of Appropriate Guidewords

Parameter/ Guide Word	**More**	**Less**	**None**	**Reverse**	**As well as**	**Part of**	**Other than**
Flow	High Flow	Low flow	No flow	Reverse flow	Deviating concentration	contamination	Deviating material
Pressure	High pressure	Low pressure	vacuum		Delta-p		explosion
Temperature	High Temperature	Low temperature					
Level	High level	Low level	No level		Different level		
Time	Too long/too late	Too short/too soon	Sequence step skipped	backward	Missing action	Extra action	Wrong time
Agitation	Fast mixing	Slow mixing	No mixing				
Reaction	Fast reaction/run away	Slow reaction	No reaction				Unwanted reaction
Start-up/	Too fast	Too slow			Action		Wrong

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Shut down					missed		recipe
Draining/Venting	Too long	Too short	none		Deviating pressure	Wrong timing	
Inertising	High pressure	Low pressure	none			contamination	Wrong material
Utility failure (instrument, air, power			failure				
DCS failure			failure				
Vibrations	Too low	Too high	None				

7. HAZOP Worksheet

The HAZOP team shall be careful when evaluating safeguards since hazard analysis requires the consequences of the failures of engineering and administrative controls. If the team determines that the safeguards are not adequate; a HAZOP recommendation is generated. The worksheets as follows:

- Node
- Guideword
- Deviation
- Causes;
- Consequences;
- Initial Risk;
- Existing safeguards;
- Residual Risk;
- Recommendation
- Responsibility
- Completion time
- Close out Description and date

Once identified, it is necessary to analyses the hazard determining whether it poses significant risk and requires management. The acceptability of the estimated risk must then be judged based on criteria as appropriate to particular situation. All identified hazards should be subject to an assessment for risk potential.

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Appendix 4 : Quantitative Risk Assessment and Acceptance Criteria

1. Introduction

Uses historical/statistical and failure data along with computer-generated consequence modelling to generate 'people' risk data. From QRAs one will get Individual Risk (IR), public risk and/or Societal Risk (SR). In principle, all events with a major accident hazard potential should, be directly passed to quantitative risk assessment (QRA).

2. Quantitative Risk Assessment Methodology/ Steps

The basic procedure in a risk analysis shall be as follows:

a) identify potential failures or incident s (including frequency) ;
b) calculate the quantity of material that may be released in each failure, estimate the probability of such occurrences;
c) evaluate the consequences of such occurrences based on scenarios such as most probable and worst case events;
d) the combination of consequences and probability will allow the hazards to be ranked in a logical fashion to indicate the zones of important risk. Criteria should then be established by which the quantified level of risk may be considered acceptable to all parties concerned;
e) after assessing the risk, the "maximum tolerable criterion" must be defined and above which the risk shall be regarded as intolerable. Whatever be the benefit level must be reduced below this level;
f) the risk should also be made "as low as reasonably practicable" (ALARP) and least impacting the neighborhood.

3. Flow Chart for Risk Analysis

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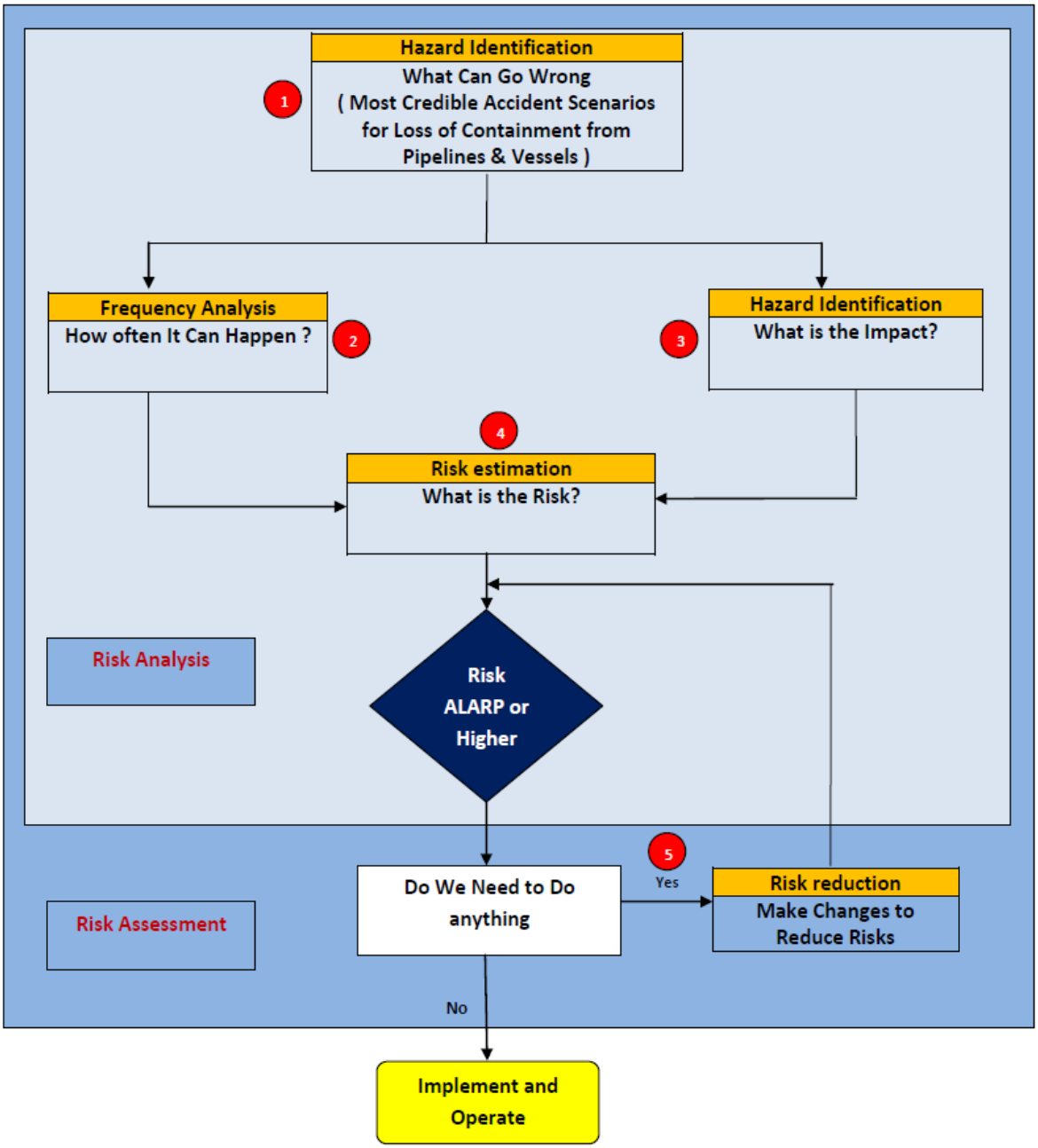

Figure : Flow Sheet For Quantitative Risk assessment

4. Risk Acceptance Criteria

In general, results of quantitative risks assessments are expressed in terms of **Individual Risk** and Risk **Societal Risk.**

A. Individual Risk

Two measures are used: Location Specific Individual Risk (LSIR) and Individual Risk Per Annum (IRPA).

- The **LSIR** measure, expresses the risk exposure to any individual, if initially present, in a particular area for one whole year or for the full duration of the activity. The risk exposure is calculated for all

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relevant hazards and summed to give the overall risk in particular areas of the plant. In the fatality estimation, the consequences of each outcome from an accidental event are represented by the probability of death for an individual initially present in a particular area of the platform when the event occurs.

LSIR (Individual Risk) = Σ Total Risk x Occupancy x Vulnerability

The **IRPA** is a person specific individual risk. The individual-specific individual risk (ISIR) is calculated taking into account the fraction of time the individual stays at the location. Normally the plant personnel work in daily shift of 8hours. Therefore the maximum individual-specific individual risk.

ISIR= LSIR x (8/24) per year.

B. Societal (or Group) Risk

Societal or group risk measures the overall risk of an Operation to the location, the industry or a community. There are several ways of presenting societal risk, but the measures most used are **Potential Loss of Life (PLL)** and **fN Curve**.

- **PLL i**s defined as the long-term average number of fatalities per year due to a specific cause. The PLL is a measure of the risk to a group of people as a whole and does not provide details on whether a particular category of personnel is more exposed than others. In measuring the effectiveness of various risks reducing measures, it is most appropriate to compare the PLL values. This approach gives an absolute measure of the benefit (or otherwise) of that particular option against a defined base case.

  SR = Σ Frequency of hazard occurring x Proportion of time person(s) are exposed x Number of people exposed x Vulnerability

- **fN** curve graphically depicts the number of fatalities as a function of the estimated frequency that those fatalities occur. The fN curve is cumulative, i.e. the frequency for N fatalities is the frequency of N or more fatalities. This approach allows to differentiate between “High Impact – Low Frequency” events and “Low Impact - High Frequency”, even if the PLL is equivalent

C. Acceptance Criteria for Individual Risk

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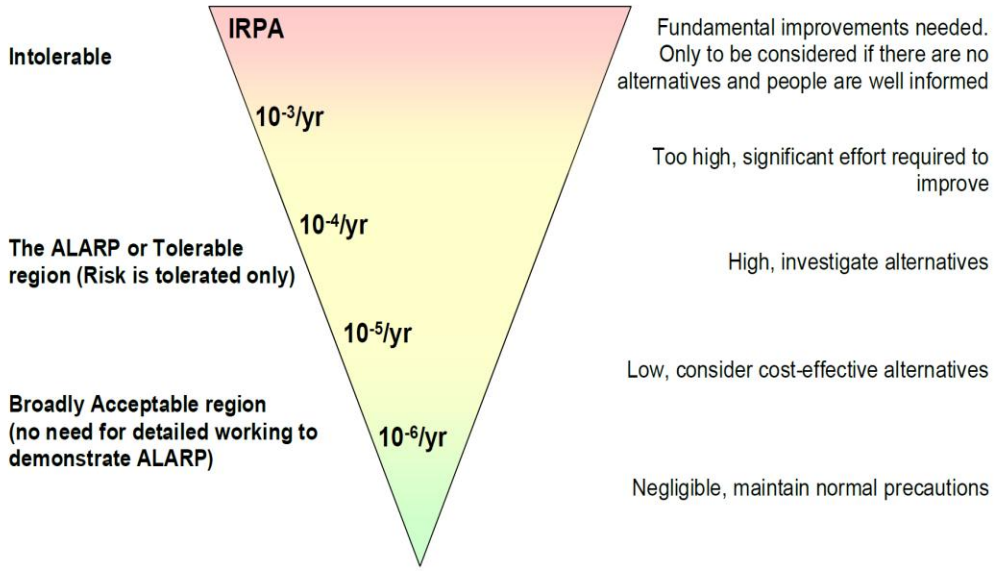

Reference : The Petroleum and Natural Gas Regulatory Board (Codes of Practices for Emergency Response and Disaster Management Plan (ERDMP)) Regulations, 2010)

D. Risk Acceptance Criteria in some Countries

Note : The IS 15656: 2006 (Annex E) has prescribed the following risk criteria in some countries

Authority and Application	Maximum Tolerable Risk (Per Year)	Negligible Risk (Per Year)
VROM, The Netherlands (New)	1.0E - 6	1.0E - 8
VROM, The Netherlands (existing)	1.0E - 5	1.0E - 8
HSE, UK (existing hazardous industry)	1.0E - 4	1.0E - 6
HSE, UK (New nuclear power station)	1.0E - 5	1.0E - 6
HSE, UK (Substance transport)	1.0E – 4	1.0E - 6
HSE, UK (New housing near plants)	3 x 1.0E - 6	3 x 1.0E - 7
Hong Kong Government (New plants)	1.0E - 5	Not used

D. Acceptance Criteria for Societal Risk

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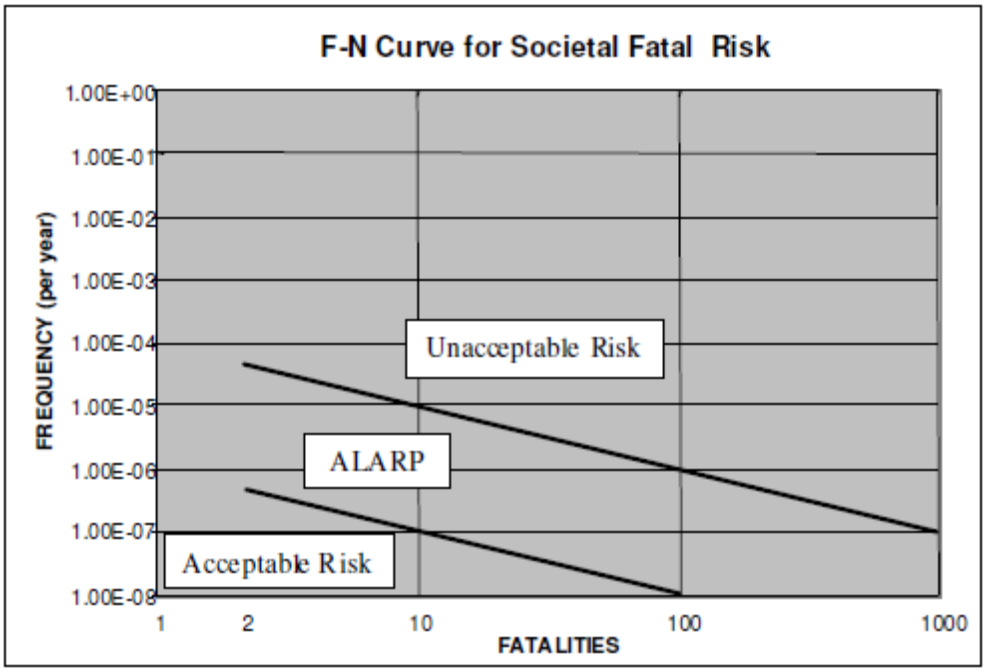

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Appendix 5 : Introduction to Risk Assessment Techniques

This appendix lists the most commonly used techniques for Risk Evaluation. These are only given as guidelines. Entities may use any Technique suitable to their Business activities and satisfying the requirements of this Code of practice

Qualitative Risk Assessment: The qualitative approach uses Risk Assessment Matrix (generally referred as hazard Identification and risk Assessment) as a guide in determining the Risk potential.

Quantitative Risk Assessment (QRA). Uses historical/statistical and failure data along with computer-generated consequence modelling to generate 'people' risk data. From QRAs one will get Individual Risk (IR), public risk and/or Societal Risk (SR). In principle, all events with a major accident hazard potential should, be directly passed to quantitative risk assessment (QRA).

What if. For relatively uncomplicated processes, review the process from raw materials to product. At each handling or processing step, "what if" questions are formulated and answered, to evaluate the effects of component failures or procedural errors on the process.

Checklist. For more complex processes, the "what if" study can be best organized through the use of a "checklist", and assigning certain aspects of the process to the committee members having the greatest experience or skill in evaluating those aspects. Operator practices and job knowledge are audited in the field, the suitability of equipment and materials of construction is studied, the chemistry of the process and the control systems are reviewed, and the operating and maintenance records are audited. Generally, a checklist evaluation of a process precedes use of the more sophisticated methods described below, unless the process has been operated safely for may years and has been subjected to periodic and thorough safety inspections and audits.

What-If / Checklist. The what-if / checklist is a broadly based hazard assessment technique that combines the creative thinking of a selected team of specialists with the methodical focus of a prepared checklist. The result is a comprehensive hazard analysis that is extremely useful in training operating personnel on the hazards of the particular operation.

The review team is selected to represent a wide range of production, mechanical, technical, and safety disciplines. Each person is given a basic information package regarding the operation to be studied. This package typically includes information on hazards of materials, process technology, procedures, equipment design, instrumentation control, incident experience, and previous hazards reviews. A field tour of the operation also is conducted at this time.

The review team methodically examines the operation from receipt of raw material to delivery of the finished product to the customer's location. At each step, the group collectively generates a listing of "what-if" questions regarding the hazards and safety of the operation.

When the review team has completed listing its spontaneously generated questions, it systematically goes through a prepared checklist to stimulate additional questions.

Subsequently, answers are developed for each question. The review team then works to achieve a consensus on each question and answer. From these answers, a listing of recommendations is developed specifying the need for additional action for study. The recommendations, along with the list of questions and answers, become the key elements of the hazard assessment report.

Hazard and Operability Study (HAZOP). HAZOP is a formally structured method of systematically investigating each element of a system for all of the ways in which important parameters can deviate

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from the intended design conditions to create hazards and operability problems are typically determined by a study of the piping and instrument diagrams (or plant model) by a team of personnel who critically analyze effects of potential problems arising in each pipeline and each vessel of the operation.

Pertinent parameters are selected, for example, flow, temperature, pressure, and time. Then the effect of deviations from design conditions of each parameter is examined. A list of key words, for example, “more of”, “less of”, “part of”, are selected for use in describing each potential deviation.

The system is evaluated as designed and with deviations noted. All causes of failure are identified. Existing safeguards and protection are identified. An assessment is made weighing the consequences, causes, and protection requirements involved.

Failure Mode and Effect Analysis (FMEA). The FMEA is a methodically study of component failures. This review starts with a diagram of the operation, and includes all components that could fails and conceivably affect the safety of the operation. Typical examples are instrument transmitters, controllers, valves, pumps, rota-meters, etc. These components are listed on a data tabulation sheet and individually analyzed for the following:

- Potential mode of failure, (i.e., open, closed, on, off, leaks, etc.)
- Consequence of the failure; effect on other components & effects on whole system.
- Hazard class, (i.e., high, moderate, low)
- Probability of failure
- Detection methods; and
- Remarks/compensating provisions.

Multiple concurrent failures also are included in the analysis. The last step in the analysis is to analyze the data for each component or multiple component failure and develop a series of recommendations appropriate to risk management.

Fault Tree Analysis. A fault tree analysis can be either a qualitative or a quantitative model of all the undesirable outcomes, such as a toxic gas release or explosion that could result from a specific initiating event. It begins with a graphic representative (using logic symbols) of all possible sequences of events that could result in an incident. The resulting diagram looks like a tree with many branches listing the sequential events (failures) for different independent paths to the top event. Probabilities (using failure rate data) are assigned to each event and then used to calculate the probability of occurrence of the undesired event.

This technique is particularly useful in evaluating the effect of alternative actions on reducing the probability of occurrence of the undesired event.

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Appendix 6 : BPCL Qualitative Risk Assessment Matrix

				PROBABILITY				
				RARE	POSSIBLE	LIKELY	OFTEN	ALOMOST CERTAIN/ FREQUENT
				(1)	(2)	(3)	(4)	(5)
CONSEQUENCE	**People**	**Process**	**Asset/Property Damage**	Has occurred in other industry	Has occurred in other Petroleum Companies	Has occurred in other BU	Happens several times each year in BU	Happens several times per year in same location or operation
Major (5)	Fatal Incident	All Fire for more than 15 minutes /Explosion or blow out /Level III Emergency	Losses above Rs. 10 Lac/ Plant Shut down or outage	**5**	**10**	**15**	**20**	**25**
Serious (4)	Reportable Lost Time Incident	All Fires less than 15 minutes/ Level II Emergency	Loss between Rs 5-10 Lac	**4**	**8**	**12**	**16**	**20**
Minor (3)	Lost Time Incident	NA	Loss less than Rs 5 Lac	**3**	**6**	**9**	**12**	**15**
Slight (2)	Medical Treatment	NA	Loss less than Rs 3 Lac	**2**	**4**	**6**	**8**	**10**
Negligible (1)	First Aid Case	NA	Loss less than Rs 1 Lac	**1**	**2**	**3**	**4**	**5**

COLOUR	RISK	REQUIREMENT	ALARP DEMONSTRATION
RED	Extreme (15-20)	Activity or industry should not proceed in current form	No
BEIGE (8-10)	High (8-10)	Activity or industry should be modified to include remedial planning and action and be subject to detailed Assessment	NO
YELLOW	Moderate (4-6)	Activity or industry can operate subject to management and / or modification	YES
GREEN	Low (1-3)	No action required, unless escalation of risk is possible	YES

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BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Project Safety Plan

(BPCL /CSMS/TS/03)

Approved By	**ED,Corporate -HSSE**
Issued By	**GM, Corporate -HSSE**
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1.0 Purpose

BPCL has a developed Corporate Safety Management System (CSMS) which defines specific requirements for managing OHS risks across its operations in accordance to its HSE policy and stakeholders expectations. The **Element 5 of Corporate Safety Management System : Planning, Standards and Procedures** requires that each BPCL location prepares and maintains a project specific safety Studies plan, which includes the identified specialized safey studies to be conducted during the different stages of the project.

This document provides guidance to BU/ Locations on identifying critical safety studies, which may be applicable to different stages of a particular project and required to be conducted to ensure safety as each project stage (referred here as **Project Safety Plan**).

The Note : BU and Locations are recommended to develop their project safety plan in accordance to specific type of project, applicable legislation and results of risk assessments.The BU/Locations may identify additional studies as may be futher needed for their projects..

2.0 Applicability

The Technical Standard applies to the all BUiness Units (BU) and Operating Locations of BPCL.

3.0 References

BPCL HSE Policy
BPCL Corporate Safety Management System System
BPCL Technical standard on Risk Assessment and Management (TS /02)
OISD Standards as related to project activities

4.0 Responsibilities

Corporate HSSE shall be responsible for updating the project safety plan in consultation with BU and Locations.

BU- HSSE / Location- HSSE shall be responsible for responsible for maintain location specific project safety plan**.**

Project Manager & Location Head shall be responsibility for preparing and updating the project safety studies plan, also for monitoring its implementation and effectiveness.

5.0 Project Safety Plan

The recommended template for project safety studies plan is enclosed at **Appendix 1.** Project Managers in consultations with user departments , HSSE role holders and other concerned persons shall prepare this plan of major safety studies based on specifics of their project including consideration to applicable legal requirements , OISD codes and best practices.Appendix 1 is only indicative.

6.0 Key Safety Documents- Operational Stage

The recommended template for Indicative key safety documents at operational stage is enclosed at **Appendix 2.**The Location HSSE Head in consultations with departmental Heads and other concerned persons shall prepare and build on this to demonstrate operational compliances specific to his location .

7.0 Review

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Corporate HSSE shall review this technical standard once in 2 years and need based in consultation with BU HSSE Role Holders.

8.0 Definitions

Item	Definition
Project Safety Plan	A project document listing all major / critical safety studies to be conducted in different project stages namely Planning; Front End Engineering Design; EPC Operation and Decommissioning / Disposal of Asset.

9.0 Abbreviations

API	American Petroleum Institute
ANSI	American National Standard Institute
ALARP	As Low As Reasonably Practicable
BPCL	Bharat Petroleum Corporation Limited
BU	Business Unit
BSMS	Business Safety Management System
CSMS	Corporate Safety Management System
ERDMP	Emergency Response and Disaster Management Plan
EPC	Eraction, Procurement and Commissioning
FEED	Front-End Engineering Design
FTA	Fault Tree Analysis
FMEA	Failure modes and effects analysis
HSSE	Health, Safety, Security , Environment
HAZOP	Hazard and Operability Analysis
HIRA	Hazard Identification and Risk Assessment
IRIS	Incident Reporting and Investigation System
ISO	International Organization for Standardization
IS	Indian Standards
JSP	Job Safety Plan
LOPA	Layers of Protection Analysis
MAH	Major Accident Hazard
NFPA	National Fire Prevention Association
LSMS	Location Safety Management System
OISD	Oil Industry Safety Directorate
RLTIFR	Reportable Lost Time Injury Frequency Rate
OHSA	Occupational Health and Safety
P &ID	Piping & Instrument Diagram
PSP	Project Safety Plan
QRA	Quantitative Risk Assessment

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SWP	Safe Work Procedure / Standard Operation Procedure
SIL	Safety Integrity Level Assessment
TS	Technical Standard
WPS	Work Permit System

Appendix 1 : Sample Project Safety Plan

Business Unit

Project Name & Number

Project Manager

(Note : This plan does not include legal licenses and permits, which shall be separately identified by BU as may applicable to any project)

Sl No	Major Safety Study Identified for the Project	Plan	Feed*	EPC	Operation	Decommission and Disposal
1.	Pre-Feasibility Report					
2.	Detailed Project report					
3.	Best Available Technology Identification Document having proven track record					
4.	List of Project Specific Design Standards/ Codes, Standards & Practices which shall be applicable on the project for design, operation and maintenance.					
5.	Project Lay outs and Drawings					
6.	Updated Process Safety Information Files from Manufacturers including Piping and Instrumentation Diagrams and Process Flow Diagrams					
7.	Rapid Risk Assessment/HAZID Study					
8.	HAZOP Study					
9.	Fire Fighting and Equipment Specification & Layout Study					
10.	Smoke & Fire Damper Layout					
11.	Fire Detection & Alarm system Layout					
12.	Gas Detection & Alarm system Layout					
13.	Hazardous Area Classification Study					
14.	Escape routes, Assembly Points & Safety signs					
15.	Fire/Gas Detection + Alarm system Study					

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Sl No	Major Safety Study Identified for the Project	Plan	Feed*	EPC	Operation	Decommission and Disposal
16.	Emergency lighting study					
17.	Quantitative Risk Assessment (Software Based considering Most Credible Risk Scenarios)					
18.	Specialized Risk Assessment Studies					
19.	Environmental Impact Assessment					
20.	Emergency Response and Disaster Management Plan					
21.	Project Safety Management Plan for Construction Safety					
22.	Safety Conditions of Contract					
23.	HAZID Updation					
24.	HAZOP Updation					
25.	Quantitative Risk Assessment Updation					

*Feed * Front End Engineering and Design*

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Appendix 2 : Indicative List of Key Safety Documentation at Operational Stage

Sl No	Safety Documentation	Status
1.	Location updated Layout	
2.	BPCL Statement of Safety Commitment and Key Principles	
3.	Location HSE Policy	
4.	BPCL 12 Life Saving Rules	
5.	Strategic Safety Objectives	
6.	Location Safety Management System Manual	
7.	Standard Operating Procedures	
8.	Process Safety Information Documents	
9.	Process Hazard Analysis Studies for all MAH installations (HAZID/ HAZOP/ QRA studies)	
10.	Activity Based Hazard Identification & Risk Register	
11.	Applicable Legal Register	
12.	Legal Compliance Records	
13.	Register of Safety Data Sheets	
14.	Documented o Work Permit System and Implementation Records	
15.	Job Safety Plans	
16.	Record of Management of Change	
17.	Statutory Test and Examination Plans and Records	
18.	Constitution of Location Safety Committees	
19.	Minutes of Safety Committee Meetings	
20.	List of Trained First Aiders	
21.	Health Surveillance Records	
22.	Employee Safety Training Plan and Records	
23.	Contractors Training Records	
24.	Drivers Training Records	
25.	Off the Job Safety Training Records	
26.	Process Safety Training Records	
27.	Equipment Inspection & Testing Plans	
28.	Management of Change Records	
29.	Pre Start Up Safety Reviews Records	
30.	Maintenance Plans and Records	
31.	Calibration Registers	
32.	Contractors Pre Qualification Evaluations Records	
33.	Contractors Orientation Meeting and Performance Evaluation Records	

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Sl No	Safety Documentation	Status
34.	Quarterly and Annual Safety Performance Metrics	
35.	Incident Reporting and Investigation Records	
36.	Leadership Safety Walk Records	
37.	Emergency Drills Plans	
38.	Emergency Response and Disaster Management Plan	
39.	List of PPE Stock & Maintenance Report	
40.	Fire Equipment Maintenance Contracts	
41.	Electrical Equipment Maintenance Contracts	
42.	Internal Safety Audits Plans and Records	
43.	External Safety Audits Plans and Records	
44.	OISD Audits	
45.	PCVO Drivers Data base	
46.	Vehicle Data base	
47.	Licensed Electrical Contractors	
48.	Licensed Electricians	
49.	High Noise Level Area Identification	
50.	Work place Potable water/ Noise/ Illumination	
51.	Permissible Exposure Monitoring and Records	
52.	Safety Campaign Plans and Records	
53.	Safety Performance Metrics (Leading Indicators)	
54.	Safety Performance Metrics (Lagging Indicators)	
55.	Process Safety Event Records	
56.	Records of Safety Recognitions	
57.	Disciplinary Actions Records	
58.	Accident Compensation Records	

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BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Safe Design & Operating Philosophies for Major Hazard Installations (BPCL /CSMS/TS/04)

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1.0 Purpose

BPCL is committed to design, construct, operate, and maintain all its installations to ensure a high level of protection for human health and the environment. BPCL installations are statutorily categorized as **Major Accident Hazard Installations** (referred herein as **"Installation"**) as they manufacture, store and transport substantial quantities of hazardous substances. **It is an obligation on all BU to reduce risks to as low as reasonably practicable (ALARP) level in all its installations.**

BPCL Corporate Safety Management System (CSMS) provides a structured Eight Tiered Safety Management Systems to enable all BUs and Locations effectively demonstrate that major accident potential risks are reduced to as low as reasonably practicable (ALARP) kevel.

The Technical Standard (TS) is intended to provide general guidance on select design philosophies / requirements to its design and operational professionals to ensure that adequate consideration is provided to relevant safey aspects at planning, design and operational phases on an installation for prevention of major accidents . Locations are required to consider the specific OISD codes based on the type of project (such as refinery,LPG, Marketing, Pipeline etc.).

In addition, Government legislation, specific national and international codes may provide the additional/stricter requirements depending upon the type and location of an in installation; process ; equipment. In such cases, the applicable statutory and codes requirements shall be complied by respective BU/Location.

BU/Location shall ensure that the design and lay out for respective installations conforms to OISD Codes as applicable.

2.0 Applicability

The standard applies to the all business units (BU) and operating locations of BPCL.

Note : The requirements TS shall be primarily applicable to installations , which falls under MAH definitions as per the MSIHC Rules as notifies. Locations other than MAH, may also adopt the relevant provisions as determined fit by them.

3.0 References

- BPCL Safety Management System
- BPCL Standard for Incident Reporting and Investigation
- BPCL Standard for Risk Assessment and Management
- OISD 118: Layouts for Oil and Gas Installations
- Other OISD Standards based on type of Installations (refinery/ LPG or Marketing)
- PNGRB Regulations
- PESO Related Regulations
- Factory Act and Rules Related Regulations

4.0 Responsibilities

Corporate HSSE shall be responsible for periodic review and updation of this standard in consultation with BU HSSE, Region HSSE and Location - HSSE Role Holders.

5.0 BPCL Design & Operating Philosophies

BPCL Safety Management Strategy in projects is summarized below:

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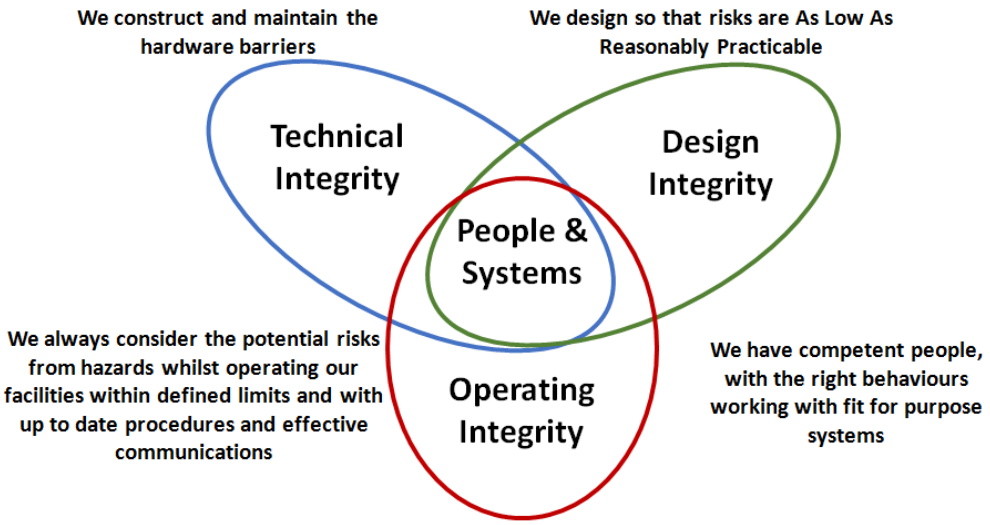

Figure 1 : BPCL Safety Management Strategy

Design Integrity is demonstrated by:

reducing process safety risks to ALARP through good engineering principles; risk analysis/assessments; integrating legal, societal concerns and incorporating learning's from incident investigations in design.

Operating integrity is demonstrated by :

1. reducing operational safety risks to ALARP by activity based hazard identification and risk assessment and using BPCL risk assessment matrix;
2. operating in accordance with plant start up, shut down, Standard Operating Procedures and management of change procedures;
3. following the Work Permit System including Job Safety Plans and associated safe systems of work;
4. operating within design envelopes; conducting operations activities in accordance with recognized good practice;
5. signing prescribed Pre Start Up Review / Pre commissioning Report by designated officers before starting up operations;
6. and maintaining emergency preparedness.

Technical integrity is demonstrated by:

7. identifying Safety critical hardware barriers through engineering documentation and risk assessments reports;
8. determining their performance standards during design, procurement, construction and commissioning;
9. maintenance / inspection programme in place for Safety critical hardware barriers.

People and Systems elements of managing risk include;

10. managing contractors to ensure that contractors are not exposed to unrecognized hazards or undertake activities that present unknown or intolerable risk;
11. providing training and conducting related activities to ensure reliable human performance at all levels of the organization;
12. learning from incidents within BPCL and within the industry;
13. measuring performance and striving to continuously improve in areas that have been determined to be risk significant;
14. periodically auditing safety management systems;

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15. holding periodic management reviews to determine if the management systems are working as intended and if the work activities are helping the facility effectively manage risk.
16. Conduct, Discipline and Appeal Rules as prescribed by BPCL Human Resource shall be in place and used consistently for safety management;
17. Clear set of Leading and Lagging Safety Performance Metrics shall be in place.
18. Corrective actions are tracked and records maintained to demonstrate closure by competent Technical Authorities.

6.0 Specific Requirements

6.1. Land Use Planning

a. For new Locations, the planning have to take into account appropriate safety distances from railways; transport routes, defense installations, locations of public use and residential areas and areas of natural/public sensitivity or interest (ecologically sensitive areas/ vulnerable areas/archeological monuments). These distances should limit the consequences of possible accidents for human health and the environment to an acceptable level.

6.2. Environmental Baseline and Environmental Impact Assessment (EIA)

a An EIA Study shall be a precondition for construction and operation of any BPCL installation , or to major changes to the facilities at or operation of an existing Location. The EIA should address the potential adverse impact of the Location on the physical and social environment. The EIA should be available for the general public and interested or affected persons to comment and provide input to the assessment and to comment on or object to the construction and operation of the Location.

b BU/Locations are responsible to prepare the EIA in a manner to conform to applicable legal and regulatory requirements. The information to be included in the environmental impact assessment documentation should, as a recommended minimum contain:

- A description of the proposed activity and its purpose;
- A description, where appropriate, of reasonable alternatives (e.g. locational or technological) to the proposed activity and also the no-action alternative;
- A description of the environmental baseline and existing characteristics/conditions;
- A description of the potential environmental impact of the proposed activity and its alternatives and an estimation of its significance (for normal operations and when accidental releases are considered);
- A description of preventive and mitigation measures to keep adverse environmental impact to a minimum;
- Risk Assessment (qualitative and quantitative) and Management Measures;
- An explicit indication of predictive methods and underlying assumptions as well as the relevant environmental data used;
- An identification of gaps in knowledge and uncertainties encountered in compiling the required information;
- An outline for monitoring and management programmes and any plans for post-project analysis;
- A non-technical summary including a visual presentation as appropriate (tables, maps, graphs, etc.).

6.3. Risk Analysis/Assessment

a. At planning and design phase of the project, risk assessments shall mandatorily include hazard Identification (HAZID) /Hazard & Operability studies (HAZOP) and Quantified Risk Assessment (QRA). based on updated drawing and design documents.

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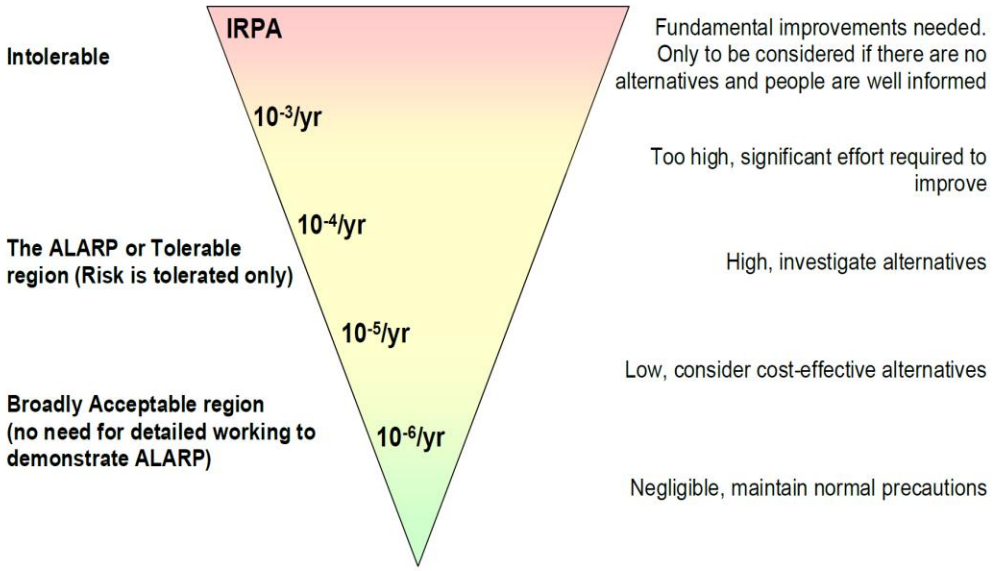
b. However, BU/ Locations may also use additional risk assessment tools such as Process Hazard Analysis (PHA), structured 'What-If?' methods and checklists, , Failure Mode Effect analysis(FMEA); Layer of protection Analysis (LOPA) or any other tool. Refer **Appendix 1** for Brief Description of select Risk Analysis/ Assessment Tools and Techniques.

c. Risk Acceptance Criteria: The following risk acceptance criteria may be used only in QRA context as statistical probability that equipment, systems and procedures fail and result in fatalities. The "IR benchmark" for new installations is the overall IR level which project teams should aim for when designing new facilities.



***Reference** : The Petroleum and Natural Gas Regulatory Board (Codes of Practices for Emergency Response and Disaster Management Plan (ERDMP)) Regulations, 2010).*

Figure 2: BPCL Individual Risk Acceptance Criteria

At operational phase of the project, BU /Locations shall adopt a methodology for the on-going hazards identification, risk assessment and determination of necessary control measures for routine and non-routine activities, and for management of change. The results of the hazard identification and risk assessments shall be documented (**Risk Registers**)and shall be available at all Locations . For establishing ALARP, Locations may use BPCL Risk Assessment Matrix.(Refer BPCL Technical Standard on Risk Assessment and Management for further Guidance).

6.4. Safety Report

All installations shall prepare a Safety Report at planning phase and update it periodically for all projects, facilities or operations in which Major Accident Hazards are deemed to occur. The Safety Report must demonstrate that the Major Accident Hazards as identified in the risk assessment are addressed to ALARP level. The safety Reports should

a Provide description of the Location , surroundings and its activities
b Identify hazards / hazardous events
c Define major Accidents Scenarios
d Assess Risk

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e Demonstrate Tolerable & ALARP Risk
f Provide Control, Mitigation and Recovery Plans
g Demonstrate how controls are managed via SMS

Note : Locations should refer to the Manufacture,Storag and Import of Hazardous Chemicals Rules 1989 as amended time to time and CIMAH Rules as notified under concerned State Factory Rules for specific safety report requirements.

6.5. Facility Siting and Layout

In the planning phase, project location selection decisions should take into account the risk of exposing human populations and vulnerable habitats to the hazards of toxic and flammable materials. The consequences of "credible case scenarios" need to be considered during the conceptual or basic engineering phase, before a large commitment has been made to a specific project location.

The following parameters should be taken into account by the project team:

- Requirements as per OISD 118: Layouts for Oil and Gas Installations
- General layout of the facility: Is there an adequate buffer zone (safety distance) between the Location and vulnerable environment/populations / and public facilities;
- Domino effects: Are there nearby sources (equipment / installations) that could threaten the entire Location by potential "domino effects";
- Secondary and tertiary Containment considerations;
- Emergency access and response support Access for Emergency Response teams (Fire Brigade, Police, Ambulance Services); (e) Power supplies: The need for emergency equipment such as lighting, fire pumps, sprinkler system to operate when the main power source is impaired;
- 'Safe Assembly Points': Are there safe assembly points are considered in case of fire and toxic releases;
- Occupied Buildings (e.g. Control Rooms, meeting rooms and offices);
- The consideration of location of occupied buildings to minimise risk for the occupants in an emergency situation such as fire or explosion i. Location (e.g. distance from the source of hazard, consideration of prevailing wind direction); ii. Construction (e.g. resistance to effects of fire (thermal radiation) and or explosion (overpressure)); iii. In the case of Control rooms – provided with uninterruptible power supplies to control systems in the event of power failure.
- Provision of Fire water and Fire protection systems. These may be provided via specific systems within the Location or local city supply or from river/sea. Capacity should be related to the fire water requirements (flow and available volume) to fight the fire event. Vulnerability to disruption during an emergency needs to be considered e.g. damage from fire or explosion causing the fire protection to fail.
- Security systems and access controls

6.6. Risk Reduction

a. When considering hazard controls, or changes to existing controls, consideration shall be given to reducing the associated risks according to the following hierarchy of controls:

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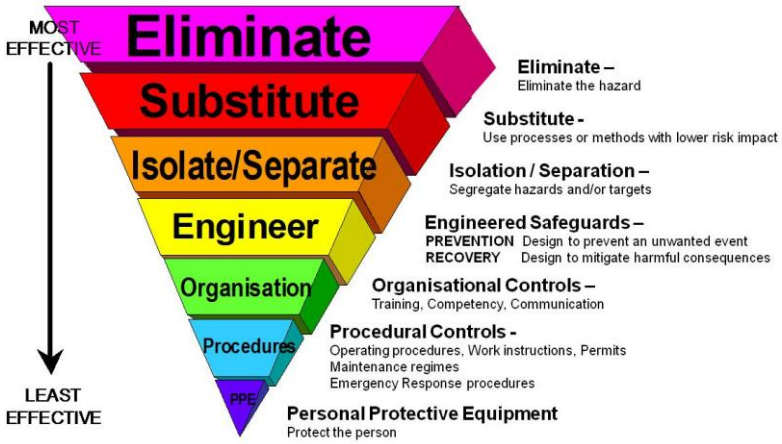

b. It will be necessary to demonstrate that best engineering practice has been used in the process design and the design of control, mitigation and recovery systems to achieve ALARP and Best Available Technology (BAT) having proven track record.

c. It will also be necessary to demonstrate that major hazards and significant environmental impacts have been addressed early enough in the design to achieve the optimum risk and impact reduction. Additionally, it will be necessary to demonstrate that occupational health and safety hazards (e.g. noise, hazardous substances) have been addressed early and that, so far as is reasonably practicable, these risks have been significantly reduced by design.

6.7. Safe Design Considerations

The following select aspects for the design and operation of equipment related to hazard / detection / control and response have to be taken into account at three levels of protection (For specific controls, Locations shall refer OISD standards).

a. All BPCL installations shall be designed, constructed and operated at least in accordance with applicable legal requirements; recognized national and international codes, standards and guidelines and, where appropriate, internationally accepted industry specifications. The codes may include OISD;IS;API; ASTM; DIN etc;

b. BU shall establish standards/ criteria for technical Integrity in design and construction and modifications in the assets. In case of any deviation from BPCl design and construction standards, prior approval shall be obtained from designated authority.

c. The unit or installation shall be designed and constructed with sufficient integrity to withstand operational and accidental loading throughout its lifecycle. The most relevant accidental loads are considered to be:
   - impact loads, including dropped object loads and collision loads
   - unintended flooding
   - loads caused by extreme weather
   - fire and explosion loads
   - heat loads
   - Seismic loads

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d. Adequate consideration shall be given to various aspects which could affect the safety of an installation, such as inherent safe design and stress factors, quality of material, ageing phenomena, external impact protection, corrosion, and monitoring.

e. Reducing storage capacity for major hazard materials as far as practicable.

f. Minimise lengths and diameters of transfer piping that can contain significant inventories of hazardous material.

g. The making and breaking of connections is a potentially hazardous undertaking both in transport situations (loading and unloading) and during maintenance. The design should minimise the need to make or break connections and must include all facilities necessary to allow the safe making and breaking of connections .

h. Emergency alarms/ ESDs/Isolating Valves/ Shut off systems shall meet the requirements of OISD codes.

i. Outdoor over ground plant units should be protected against the force of buoyancy during flood events and from mechanical damages due floating substances or objects.

j. Underground tanks and pipelines should be secured against the force of buoyancy;

k. Level measurements devices should be installed with logic solver, which include Low and High level alarms with automatic shut off/ shut down systems in case of violation of safe operating limits. **Appendix 2** lists some of the more common causes of loss of containment from pressurized equipment.

l. Provision for selection of electrical and control on static charge hazards shall be as per OISD Codes.

m. Provide a Leak Management System (detection, analysis, remediation, analyze/improve) for all installations.

a. Storage tanks shall be located inside a retaining wall on a solid foundation. The Double-wall requirements shall be considered wherever applicable such as storage of cryogenic liquids/corrosive acid and bases.

b. Transshipment Locations should have adequate retention facilities capable of accommodating the volumes of liquid that can escape until suitable measures or automatic safety systems take effect (secondary containment);

c. Construction of containments shall be impermeable: The integrity of sealed systems must be in accordance with the physical-chemical properties of the substances handled. The integrity of the containment should be demonstrated by generally accepted and recognized testing method/engineering standards;

d. Dyked enclosures capacities shall conform to specific OISD code requirements.

e. Additional tertiary containment volume for fire fighting water retention shall also be considered.

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f. Gas and Flammable Vapour Detection system shall be provided at all installations.

g. The Central Control Room (CCR) shall be permanently manned 24 hours a day.

a. Meeting the hazardous area classification and management (area classification, distances and selection of appropriate type electrical equipment as per OISD Codes.

b. Locations shall establish comprehensive management system for regular inspection, testing, maintenance and calibration of equipment to ensure their reliability in operation as per manufacturer's recommendations and applicable legislations. Periodic test by (external) experts/agencies of the safety-systems. This test should be documented and retained by the Location in equipment files.

c. BU shall determine and conduct Safety Integrity Level (SIL) studies for safety critical protective systems as per IEC 61511: Safety instrumented systems for the process industry sector/ IEC 61508 (Functional safety of electrical/electronic/programmable electronic safety related systems) and equivalent standards.

d. Planned maintenance will be carried out during dayshift. In case of extension, to night shifts, work permit shall be obtained from designated official. Breakdown maintenance during night time will be carried only by exception and will be subject to risk assessment to ensure risk is ALARP.

6.8. Quality Assurance During Procurement, Fabrication, Installation and Commissioning

a. A quality assurance programme ensures that equipment is purchased and built according to the design requirements, while meeting all applicable legal and technical standards and codes.

b. The Location is recommended to have a quality assurance programme in place to prevent equipment failures that could result from:
   I. Use of faulty parts / materials due to improper controls at material/ parts delivery stage;
   II. Improper fabrication, installation or repair methods.

c. The Location’s safety management system should provide guidance and mechanisms to assure that appropriately qualified and trained craftsmen (such as certified welders) are used for specified vessel and piping fabrication and for installing safety critical equipment and instrumentation.

d. A material tracking programme should be in place as control function to ensure that materials and equipment are purchased as specified in the Location's requirements database.

e. The material certificates supplied by tank fabricators should be stored in the Location's equipment file.

6.9. Over Pressure Protection

a. The process safeguarding system must ensure that suitable protection is provided against the maximum pressure that can be generated by the worst credible malfunction. There are essentially three ultimate safeguard options to protection against overpressure:
   - Fully pressure rated equipment
   - Relief valves
   - Instrumented Protected Function only

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b. Pressurized systems must be designed to contain hazardous material for the whole of their design life.

6.10. Under Pressure Protection

Certain process can develop sub atmospheric pressure conditions generated by the worst credible scenario. The process safeguarding system must ensure suitable protection against minimum pressure or vacuum conditions. The ultimate safeguard for under pressure can be:

- Design for vacuum
- Provision of Vacuum Relief valves

6.11. Shutdown

a. In case of any malfunction of the plant equipment or its associated control instrumentation giving rise to a hazard for personnel or the environment, or potentially leading to consequences of economic loss (e.g. damage of main equipment or severe production loss), the safeguarding system shall bring automatically the facility to a safe condition. The safeguarding system shall also prevent the start-up of system /unit/ equipment till a safe start conditions are satisfied.

b. The safeguarding system shall also bring the facility to a safe condition in case of:

- Confirmed detection of fire
- Confirmed Hydrocarbon gas (based on Lower Flammability Limit) / Toxic gas detection
- Instrument air failure
- Electrical supply failure
- High Level in Flare
- Manual Action ESD push button (Remote/ Local)

6.12. Segregation of Areas

a. The unit or installation shall be divided into different areas according to the type of activities that will be carried out and the associated hazard potential.

b. Areas of high risk potential shall be segregated from areas of low risk potential, and from areas containing important safety functions. Incident escalation between areas shall be avoided.

c. Accommodation and other areas important for safety, such as control stations, shall be located in areas classified as non-hazardous by location, and as far as practicable away from hazardous areas for hydrocarbon processing and hydrocarbon storage. The effect of prevailing winds and potential for segregation by less hazardous areas shall also be considered for area protection.

d. Use of firewalls, blast walls, cofferdams etc. shall be considered in cases where segregation by physical distance is not sufficient.

e. Where control stations or control functions are located in local equipment room / local instrument room safe area special precautions against gas ignition related to gas detection, ventilation and shutdown will need to be provided.

6.13. Storage of Hazardous Substances and Cryogenic Liquids

a. Stores for hazardous substances shall be segregated from, and located at a safe distance from accommodation spaces and control stations.

b. Indoor storage areas are to have efficient ventilation.

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c. Equipment for storage and handling of cryogenic liquids (e.g. liquid nitrogen) shall be located in open areas with efficient natural ventilation. Equipment with potential for significant leakage shall be located in a bunded area, which is constructed of materials suitable for sustaining low temperatures.

6.14. Location of Critical Safety Controls

a. Important safety controls and equipment shall be located such that they can remain operational during the defined accidental events. Controls for safety systems shall be located where they are accessible and available for safe, simultaneous use during an emergency.

b. The emergency and UPS systems and associated controls etc. shall be self-contained, and located such that they are not vulnerable to events that affect main power supply.

c. Control panels and energy or actuation sources for plant equipment, pipeline and ESD valves shall be protected from accidental events such as fire, explosion and mechanical impact, to ensure emergency operation of the barrier as necessary.

6.15. Hazardous Area Classification

a. The provisions of hazardous are classification are intended to avoid ignition of potential flammable releases that may occur on the unit or installation during normal operation. Release as a result of accidental events such as blowout or vessel rupture is not addressed by area classification, but shall be covered by emergency measures.

b. Hazardous area classification shall be documented by drawings including location and selection of equipment, air inlets and exhausts.

c. Definition of hazardous areas: Hazardous areas are all areas in which explosive gas or air mixture may normally be expected to be present in quantities which can require special precautions for the construction and use of electrical equipment and machinery. Hazardous areas are divided into zones depending upon the grade (frequency and duration) of release:

- *Zone 0:* in which an explosive gas atmosphere is continuously present or present for long periods. (Typical for continuous grade source present for more than 1000 hours a year or that occurs frequently for short periods).
- *Zone 1:* in which an explosive gas atmosphere is likely to occur in normal operation. (Typical for primary grade source present between 10 and 1000 hours a year).
- *Zone 2:* in which an explosive gas atmosphere is not likely to occur in normal operation, and if it does occur, is likely to do so infrequently and will exist for a short period only. (Typical for secondary grade source present for less than 10 hours per year and for short periods only).

Note that conditions of ventilation may change the zone definition for each grade of release. Also, the likelihood of detecting the leak may influence the zone.

d. Hazardous fluids (sources)

The following fluids shall be considered as sources requiring area classification:

I. Flammable gas or vapour.

II. Flammable liquids which are handled at or above their flashpoint, or which could be heated to the flashpoint after release.

III. Flammable liquid that could form a flammable mist.

IV. Fluids which satisfy the criteria in a), b) or c), and which are present periodically within the plant for 100 hours per year or more (e.g. during start-up).

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V. Unclassified, flammable liquids containing residual, volatile materials and which are stored under confined, heated conditions give rise to limited area classification.

e. General principles for area classification

a) Location of a continuous source within an enclosed area, or in open areas with significant obstructions to ventilation, shall be avoided.
b) The number and release rate of primary grade sources shall be minimized as far as practicable. Location of a primary grade source within an enclosed area shall as far as practicable be avoided.
c) It is not normally acceptable to locate open, non-hazardous areas enclosed, or significantly enclosed, by hazardous areas.
d) Openings, penetrations or connections between areas of different hazardous area classification shall be avoided, e.g. through ventilation systems, air pipes or drain systems.
e) The extent of the hazardous area depends on the rate of release, ventilation conditions, and fluid properties.
f) The extent of the hazardous area shall be based on guidance given in OISD standards.
g) All electrical installations in hazardous areas shall comply with the OISD requirements.

6.16. Emergency Shut Down Systems

The ESD system shall be designed so that the risk of unintentional shutdown caused by malfunction or inadvertent operation is minimized.

a) The ESD system shall be designed to allow testing without interrupting other systems onboard.
b) The ESD system shall have continuous availability .
c) The ESD Location Station shall be located in a non-hazardous and continuously manned area.
d) The ESD central control unit shall be powered from the main power system and from a monitored Uninterruptible Power Supply (UPS) capable of at least 30 minutes continuous operation on loss of main power. The UPS shall be powered from both the main and the emergency power system.
e) Shutdowns shall normally be automatically initiated, however solely manually initiated actions may be provided where automatic action could be detrimental to safety, e.g. during drilling and dynamic positioning.
f) Alarm for manual initiation shall be clear, and shall be readily identifiable at a permanently manned control station. The Location must have sufficient time to acknowledge and execute shutdown before an incident escalates. Manual activation shall be simple and quick to operate.
g) In all shutdown systems, it shall be possible to manually activate all levels of shutdown at the main control station.
h) Other manual shutdown buttons shall be located at strategic locations on the unit or installation.

6.17. Alarms

a. Alarms initiated from the following systems shall be provided where relevant:

- general emergency (ESD)
- fire detection
- hydrocarbon gas detection
- toxic detection
- machinery fault detection.

b. All alarms shall be indicated visually and audibly in the control centre.

c. An alarm philosophy shall be established ensuring that the alarms are simple and unambiguous. The philosophy shall define which alarms are broadcast to the entire unit or installation and whether this should occur automatically or not.

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d. The unit or installation shall be equipped with a public address system. The alarm system may be combined with the public address system, provided that:
   - alarms automatically override any other input
   - volume controls are automatically set for alarm sounding
   - all parts of the public address system (e.g. amplifiers, signal cables and loudspeakers) are made redundant
   - redundant parts are located or routed separately
   - all loudspeakers are protected with fuses against short circuits.

e. The number of alarms during abnormal conditions shall be assessed and reduced as far as practicable by alarm processing/suppression techniques in order to have Location attention on the most critical alarms that require Location action.

f. The alarms shall be clearly audible at all locations on the unit or installation, and shall be easily distinguishable. If noise in an area prevents the audible alarm being heard a visible means of alarm shall be provided.

g. Activation of the general alarm shall be possible from the main control stations, including navigation bridge and radio room.

h. In addition to the alarm systems, a two-way communication system shall be provided for transmittal of alarm, instructions and information between those who may require them.

i. The alarm and communication system shall be powered from the main power system and from a monitored Uninterruptible Power Supply (UPS) capable of at least 1 (one) hour continuous operation on loss of main power. The UPS shall be powered from both the main and the emergency power system.

j. The alarm system shall be regularly tested.

6.18. Corrosion Management Framework

All Locations must develop a corrosion management strategy early during the design process to ensure that all design decisions regarding corrosion management are implemented during operation. This will also ensure a consistent approach to corrosion management and that all necessary facilities, such as corrosion monitoring points, are included.

The integrity of insulation wrapping in marine environments may degrade over time, allowing water or salt to accumulate under the insulation and causing high corrosion rates for the equipment beneath .The design should minimise the use of insulation in such circumstances and alternative strategies should be developed for heat conservation and personal protection where this is reasonably practicable.

6.19. Fire and Explosion Assessment

Fire & Explosion Assessments (FEA) are required for the introduction of new hydrocarbon equipment, or new occupied installations. The FEA shall provides input the fire and risk management strategy that should be applied to the installation.

7.0 Review

Corporate -HSSE shall review this technical standard once in 2 years and need based in consultation with BU HSSE Role Holders

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8.0 Definitions

As Low As Reasonably Practicable	Means to reduce a risk to a level that is as low as reasonably practicable and involves balancing reduction in risk against the time, trouble, difficulty and cost of achieving it. This level represents the point, objectively assessed, at which the time, trouble, difficulty and cost of further reduction measures becomes unreasonably disproportionate to the additional risk reduction obtained.
EIA Report	The Control of Major Accident Hazards Report is a report compiled by a third party and submitted to BPCL, as part of the EIA process, that demonstrates that the Location has taken all steps necessary to prevent major accidents and to reduce their consequences.
Safety Critical	Of particular importance to preventing, controlling or mitigating the risks from major accident hazards or occupational hazards with the potential for severe or catastrophic consequences (as defined in BPCL Risk Management Guideline). It can apply to equipment, management systems, procedures, records, activities and tasks (and the competencies required for these tasks).
Incident	An event or chain of events which has caused or could have caused fatality, injury, illness, and/or damage (loss) to assets, the environment, company reputation or third parties.
Inherent Safety	Design philosophy that utilizes the laws of physics and chemistry to prevent and control incidents rather than alarms, interlocks, process trips and similar systems.
Major Accident	Major accident means an 'Uncontrolled Occurrence' in the operation of a Location which leads to severe or catastrophic consequences to people, assets, the environment and/or company reputation (as defined in the BPCL Group HSE Risk Management Guidelines). The consequences may be immediate or delayed and may occur outside as well as inside the Location. There will also be a high potential for escalation.
Major Accident Hazard	A hazard that has the potential to result in a 'Major Accident'.
Major Accident	Where the conditions, substances and materials on a Location, and the location of the Location, are such that a 'Major Accident Hazard' is present and there is therefore the possibility of a 'Major Accident'.
Substances Which Constitute a Major Accident Hazard	A substance constitutes a hazard by virtue of its intrinsic chemical properties or of its temperature and pressure or some combination of these. A substance is a 'Major Accident Hazard' if, because of its intrinsic chemical properties, temperature, pressure and inventory, it has the potential to result in a 'Major Accident' (Refer Schedule 1,2 and 3 of the Manufacture,Storag and Import of Hazardous Chemical Rules)
Uncontrolled Occurrence	An event that escalates, or has the potential to escalate, so that it is beyond the normal span of operations over which control can be exercised.
Work Permit System	Prior mandatory approval in prescribed formats by notified issuing authorities . This Job safety Plan as its integral part of issuing process.

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9.0 Abbreviations

API	American Petroleum Institute
CCR	Centralized control room
ESD	Emergency shutdown
FMEA	Failure mode and effect analysis
HAZID	Hazard identification
HAZOP	Hazard and operability (study)
IEC	International Electrochemical Commission
IMO	International Maritime Organization
ISO	International Organisation of Standardisation
LAHH	Level alarm high high
LALL	Level alarm low low
LEL	Lower explosion limit

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Appendix 1: Risk Analysis/ Assessment Tools & Techniques

A. Preliminary Hazard Analysis (PHA)

PHA is a simple, inductive method of analysis whose objective is to identify the hazards and hazardous situations and events that can cause harm for a given activity, facility, or system. It is most commonly carried out early in the development of a project when there is little information on design details or operating procedures and can often be a precursor to further studies or to provide information for specification of the design of a system. It can also be useful when analysing existing systems for prioritising hazards and risks for further analysis or where circumstances prevent a more extensive technique from being used.

environment, and/or organisational objectives. The study team is also expected, where possible, to provide a solution for treating the risk. The HAZOP process is a qualitative technique based on use of guide words that question how the design intention or operating conditions might not be achieved at each step in the design, process, procedure, or system. It is generally carried out by a multi- disciplinary team during a set of meetings. HAZOP is similar to FMEA in that it identifies failure modes of a process, system, or procedure, their causes and consequences. It differs in that the team considers unwanted outcomes and deviations from intended outcomes and conditions and works back to possible causes and failure modes; whereas, FMEA starts by identifying failure modes. The HAZOP technique was initially developed to analyse chemical process systems, but it has been extended to other types of systems and complex operations. These include mechanical and electronic systems, procedures, and software systems, and even to organisational changes and to legal contract design and review.

B. Hazard Identification Workshop (HAZID)

HAZID is a generic term for different types of hazard identification study. A HAZID is typically, a formal systematic critical examination of the threats – both internal and external – which may be experienced by an asset or project. HAZID identifies the causes of hazard events and the potential consequences. Measures which prevent hazard events and measures which mitigate hazard events are also identified.

A HAZID will often address both process and non-process hazards. The HAZID is therefore a useful preliminary step to a Quantified Risk Assessment which accounts for both process and non-process hazards:

Examples of Process Hazards include:

- Uncontrolled release of hazardous material;
- Inflammability;
- Explosion;
- Corrosion;
- Toxicity;
- Reactivity;
- Run away reactions;
- Environmental hazards (e.g. release of process materials to land or air).

Examples of Non-process Hazards include:

- Natural occurrence (e.g. seismic events, extreme weather);
- Physical impacts (e.g. dropped loads, vehicle / ship impacts);
- Structural failures (e.g. foundations failure, fatigue);

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- Indirect events (e.g. human error, unreliability of equipment);
- Occupational hazards (e.g. noise, asphyxiation, falls).

C. Hazard Operability Workshop (HAZOP)

HAZOP is the acronym for Hazard and Operability study and is a structured and systematic examination of a planned or existing product, process, procedure, or system. It is a technique to identify risks to people, equipment.

D. Structured "What-if" Technique (SWIFT)

SWIFT was originally developed as a simpler alternative to HAZOP. It is a systematic, team based study, utilising a set of 'prompt' words or phrases that are used by the facilitator within a workshop to stimulate participants to identify risks. The facilitator and team use standard 'what-if' type phrases in combination with the prompts to investigate how a system, plant item, organisation, or procedure will be affected by deviations from normal operations and behaviour. SWIFT is normally applied at more of a system level with a lower level of detail than HAZOP. While SWIFT was originally designed for chemical and petrochemical plant hazard studies, the technique is now widely applied to systems, plant items, procedures, and organisations generally. In particular, it is used to examine the consequences of changes and the risks thereby altered or created.

E. Failure Mode and Effect Analysis (FMEA) and Failure modes and effects and criticality analysis (FMECA)

Failure modes and effects analysis (FMEA) is a technique used to identify the ways in which components, systems, or processes can fail to fulfil their design intent. FMEA identifies the following:

All potential failure modes of the various parts of a system (a failure mode is what is observed to fail or to perform incorrectly);

- The effects these failures may have on the system;
- The mechanisms of failure; and,
- How to avoid the failures, and/or mitigate the effects of the failures on the system.

FMECA extends an FMEA so that each fault mode identified is ranked according to its importance or criticality. This critical analysis is usually qualitative or semi-quantitative but may be quantified using actual failure rates.

F.Layers of Protection Analysis (LOPA)

LOPA is a semi-quantitative method for estimating the risks associated with an undesired event or scenario. It analyses whether there are sufficient measures to control or mitigate the risk. A cause-consequence pair is selected and the layers of protection that prevent the cause leading to the undesired consequence are identified. An order of magnitude calculation is carried out to determine whether the protection is adequate to reduce risk to a tolerable level. LOPA may be used qualitatively, simply to review the layers of protection between a hazard or causal event and an outcome. Normally, a semi-quantitative approach would be applied to add more rigour to screening processes, for example, following HAZOP or PHA. LOPA provides a basis for the specification of independent protection layers (IPLs) and safety integrity levels (SIL levels) for instrumented systems, as described in the IEC 61508 series and in IEC 61511, in the determination of safety integrity level (SIL) requirements for safety instrumented

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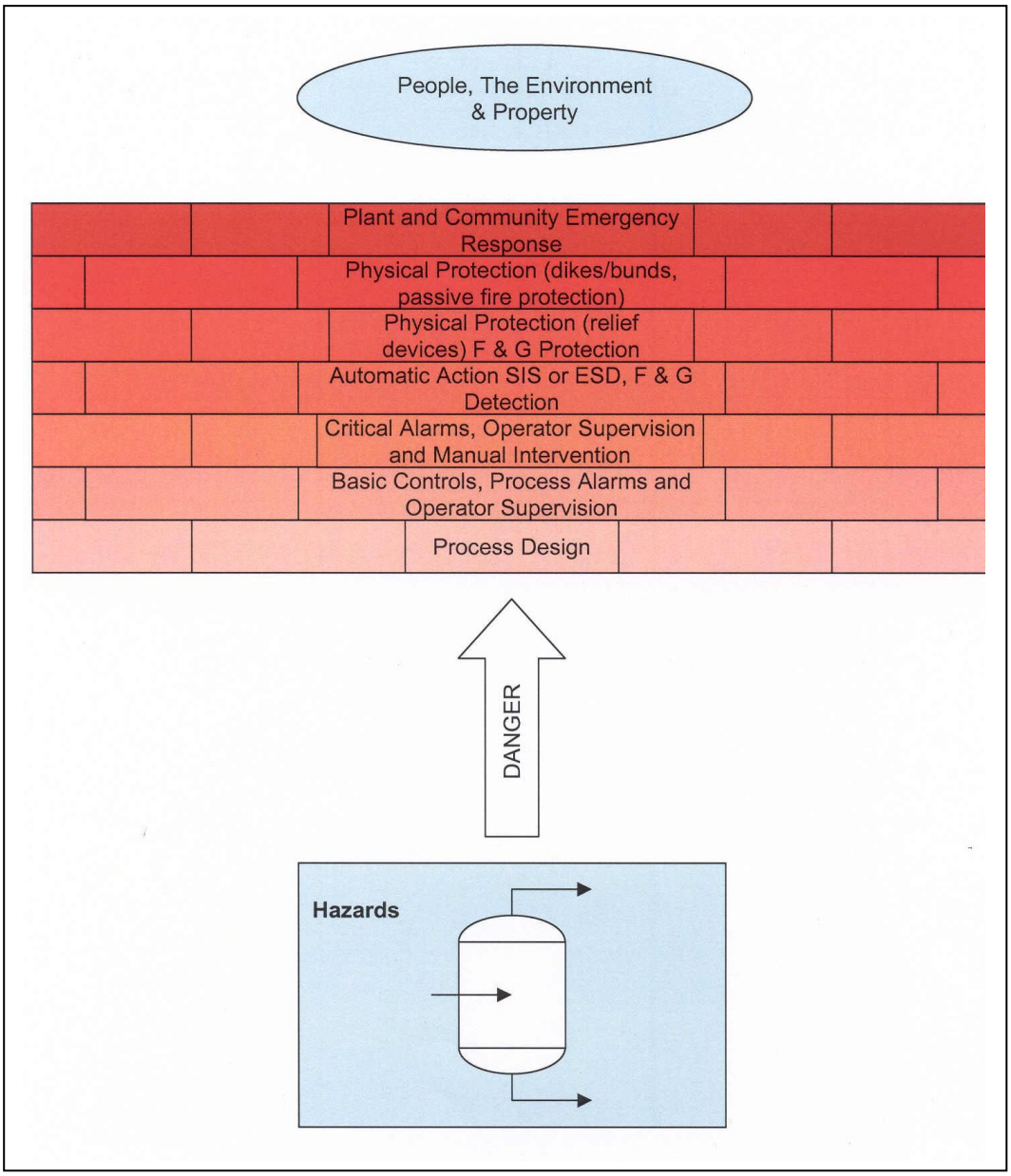
systems. LOPA can be used to help allocate risk reduction resources effectively by analysing the risk reduction produced by each layer of protection.



G. Fault Tree Analysis (FTA)

FTA is a technique for identifying and analysing factors that can contribute to a specified undesired event (called the "top event"). Causal factors are deductively identified, organised in a logical manner, and represented pictorially in a tree diagram that depicts causal factors and their logical relationship to the top event. The factors identified in the tree can be events that are associated with component hardware failures, human errors, or any other pertinent events that lead to the undesired event. A fault tree may be used qualitatively to identify potential causes and pathways to a failure (the top event) or quantitatively to calculate the probability of the top event, given knowledge of the probabilities of causal events.

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H. Event Tree Analysis (ETA)

ETA is a graphical technique for representing the mutually exclusive sequences of events following an initiating event according to the functioning/not functioning of the various systems designed to mitigate its consequences. It can be applied both qualitatively and quantitatively. ETA can be used for modelling, calculating, and ranking (from a risk point of view) different accident scenarios following the initiating event. ETA can be used at any stage in the life cycle of a product or process. It may be used qualitatively to help brainstorm potential scenarios and the sequences of events following an initiating event and how outcomes are affected by various treatments, barriers or controls intended to mitigate unwanted outcomes.

i. Quantitative Risk Assessment

Refer BPCL/CSMS/TS/02 for details

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Appendix 2: Common Causes of Loss of Containment

Common Causes (not all causes necessarily apply to all equipment)
1. Rupture of equipment due to over-pressurisation: a. Inadequate relief due to: • Absence of relief • Incorrect sizing of relief device • Incorrect installation of relief device • Incorrect material of construction of relief device • Isolation of relief device due to Location error • Excessive backpressure limiting capacity of relief device • Plugging of the relief device by foreign materials b. Fire on near-by equipment
2. Rupture of equipment due to brittle fracture a. Incorrect material specification b. Equipment not designed for sudden depressurisation resulting in low temperature.
3. Leaks from flanges, gaskets and plugs a. Incorrect gasket (size / material) installed b. Incorrect installation (e.g. incorrect size or incorrectly tightened) c. Gasket omitted.
4. Weld failure / casting failure a. Incorrect welding or casting procedure b. Incorrect specification of design codes c. Failure to stress-relieve if needed. d. Improper inspection / testing procedure
5. Mechanical overstressing of equipment a. Incorrect specification of design code b. Incorrect setting of spring hangers and pipe support or they are not set free c. Error in stress analysis calculations.
6. Vibration a. Inadequate support b. Failure to correctly align reinstating equipment c. Failure to test for vibration of reinstating equipment prior to start-up after installation or maintenance. d. Failure to check for tube vibration during design of exchangers e. Failure to stop operating when vibration exceeds limits

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Common Causes (not all causes necessarily apply to all equipment)
7. Corrosion / erosion a. Corrosion due to abnormal process conditions b. External corrosion from atmosphere. c. Erosion due to high velocities, dust and debris, or liquid droplets. d. Lack of periodic inspection and correction. e. Concentration of corrosive agents in crevices or pockets
8. Failure due to external loading or impact a. Error in foundation design (e.g. hydraulic head not considered) b. Foundation collapse c. Excessive ground movement, earthquake. d. Collapse of fan motor onto air fans. e. External impact during maintenance (e.g. crane operations) f. Vacuum (when not designed for vacuum).
9. Internal Explosion a. Improper purging of air from the system prior to admitting combustible material. b. Failure to isolate system prior to maintenance. c. Ingress of flammable material following loss of containment elsewhere: • Into equipment skirt followed by local ignition • Into fire box of fired equipment d. Human error when operating fired equipment manually e. Liquid carry over to gas burners.

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Bharat Petroleum

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BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Incident Reporting, Classification and Investigation

BPCL/CSMS /TS/09

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1.0 Purpose

BPCL is committed to managing health and safety risks and improving safety performance and has developed a Corporate Safety Management System (CSMS) which defines specific requirements for managing OHS risks across its operations in accordance to its HSE policy and stakeholders expectations.

Element 6 of Corporate Safety Management System : Implementation, Monitoring and Performance Reporting requires that each BPCL BU/ Location establish incident reporting, classification and investigation process and procedures.

This Technical Standard (TS) is intended to provide the basic framework for Reporting, Classification and Investigation/ Analysis of Incidents which occur may on BPCL locations involving BPCL staff, members of public, visitors or contractors. Any BPCL location having an existing system, standards and procedures on incident investigation, may assess practices shared in the TS and can improve upon them.

Requirement and practices indicated in the TS does not intend to replace any applicable regulatory requirements and in case of any conflict local laws shall prevail.

2.0 Applicability

The standard applies to the all Business Units (BU) and operating locations of BPCL.

3.0 References

BPCL HSE Policy
BPCL Safety Management System
BPCL Incident Investigation and Reporting System (IRIS)
The Petroleum and Natural Gas Regulatory Board (Codes of Practices for Emergency Response and Disaster Management Plan (ERDMP)) Regulations, 2010.

4.0 Responsibilities

Corporate- HSSE shall be responsible for developing and updating this standard to ensure its continued relevance to BPCL.

BU / Locations shall establish an effective incident reporting, investigation and analysis program /procedures in their respective locations to include the following (but not limited to):

- Management commitment to ensure that all incidents are reported regardless of the severity of injury, duly investigated to identify all contributory causes (immediate and basic) and appropriately addressed to prevent their reoccurrence;
- Incident Classification System based on severity of consequences, which may occur;
- Incident reporting procedures;
- Step-by-Step incident investigation methodology based on their classification;
- Constitution of investigation team and appointment of team leader based on type of incidents;
- Incident investigators training requirement;
- Process to determine the incident causation factor and how to establish cause-effect relationship;
- Determine corrective and preventive actions;
- Reporting Requirement, time frame and distribution to key duty holders, who shall be responsible to implement;

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- Documents and records keeping;
- Preparation of quarterly and annual summary and statistics reports;
- Roles, responsibilities and accountabilities of personnel, who shall have specific responsibility to effectively implement the above program.

Managers/ Officers shall be responsible to drive implementation and enforcement of this TS. They are responsible for:

- Initiating the investigation of reported incidents;
- Ensuring that accident / incident is reported within BU and BPCL Corporate, as required;
- Ensuring the implementation of any corrective and / or preventative measures.

Location HSSE Role Holders

- Coordination of accident and incident reporting and investigation;
- Maintenance of accident and incident records.

Employees

- All employees have a responsibility to report accidents and incidents occurrences to the immediate line manager/officer, shift incharge or safety representative.

5.0 Key Principles

BPCL incident investigation program is based on the following underlying principles:

a) Incidents don't just happen. They are caused.
b) Incidents can be prevented if causes are eliminated;
c) Causes can be eliminated if all incidents are investigated properly;
d) Unless the causes are eliminated, the same situation will reoccur;
e) All incidents including near misses shall be reported regardless of their severity of injury and duly investigated;
f) All incident investigation in BPCL shall be conducted keeping prevention in mind and not fault finding.
g) Incident investigations shall be conducted in transparent manner.

6.0 BPCL Incident Classification System

The classification of the safety incident shall be based on the **most serious consequences of the incident** as shown in **Table 1** below. **In case of any difficult in decision making, higher classification should be selected.**

TABLE 1: BPCL INCIDENTS CLASSIFICATION MATRIX*

Type of Incident	MINOR INCIDENTS	SERIOUS INCIDENTS	MAJOR INCIDENTS *(As per ERDMP, Rules, 2010)*
Fire	Not Applicable	a) All **Fire less than 15** minutes	a) All **Fire** for **more than** 15 minutes
Explosion	Not Applicable	Not Applicable	b) **Explosion / blowout**

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Injury	a) Any Lost Time Injury Incident (Absence from workplace more than 24 hours but less than 48 Hours) b) Medical treatment cases and first aid cases	b) Any Reportable Lost Time Injury Incident (Absence from workplace more than 48 hours and above.	c) Fatal incident* Note*: • All fatality including at operating locations or project locations; • Product transportation involving crew/ or members of public ; • At customer premises;
Property Damage	c) Loss less than **Rs 5 Lac**	**c)** Loss between **Rs 5-10 Lac**	d) Loss above **Rs. 10.0 Lac**
Man Day Loss	**d) Individual/ Cumulative man hours lost less than 48 hrs.**	**d) Individual/ Cumulative man hours lost 48 - 500 hrs.**	e) **Individual/ Cumulative man hours lost more than 500 hrs.**
Plant Shut Down	Not Applicable	Not Applicable	f) **Plant shutdown / outage due to the incident**
Classification of Emergency	**Level-I Emergency Incident** as per ERDMP,2010 Regulation of PNGRB	e) **Level-II Emergency Incident** as per ERDMP,2010 Regulation of PNGRB	g) **Level-III Emergency Incident** as per ERDMP,2010 Regulation of PNGRB

**Note 1 : BU may add additional definition of incidents under the relevant category, if needed.*

Note 2 : Unplanned Events due natural calamities like flood, cyclones, lightening , earth quakes resulting in shut downs , property damages including their forecasts shall be included under "Major incidents".

7.0 Description of Incidents

The details of the incident should be factual and relevant. Describe the details of the incident as clearly as possible. This should include the exact time and place of the incident, the circumstances which led up to it, the sequence of events in the incident itself, the number, names and contact details of people involved, the names and contact information of any witnesses present and the names of immediate concerned line managers.

8.0 Internal Reporting of Incidents

a. All safety incidents regardless of their severity to the employees, contractor's employees, visitors and public shall be reported through BPCL on-line Incident Reporting System (IRIS) promptly.

b. Respective location shall define the internal reporting systems for **" Minor Incidents"** as determined suitable by them.

c. All **" Serious and Major** " safety incidents shall be reported by location head or his designated official to respective Business unit and corporate HSSE in accordance to Table 2 as shown below:

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TABLE 2 :BPCL INTERNAL INCIDENT REPORTING SYSTEM							
	LOCATION	BUINESS UNIT			CORPORATE HSSE		
Classification	Mode	Time Frame	Method	To	Time Frame	Method	To
MAJOR INCIDENTS	Initial Incident **Verbal Reporting**	Immediate within **02 Hours**	Phone / Message through SMS	SBU Head, Regional HSSE Role Holder HQ HSSE Role Holder; and Other Point of Contact (POC)	Immediate within **02 Hours**	Phone / Message through SMS	ED HSSE, GM HSSE and Other Point of Contact (POC) ED (HSSE) to inform Director(R)
	First Hand Incident Written Reporting (FIR)	Within **12 hours** after the occurrence of incident	IRIS and E- mail		Within **12 hours** after the occurrence of incident	IRIS and E- mail	
SERIOUS INCIDENTS	Initial Incident **Verbal Reporting**	Immediate within **04 Hours**	Phone / Message through SMS	SBU Head, Regional HSSE Role Holder HQ HSSE Role Holder; and Other Point of Contact (POC	Immediate within **04 Hours**	Phone / Message through SMS	ED HSSE, GM HSSE and Other Point of Contact (POC) ED (HSSE) to inform Director(R)
	First Hand Incident Written Reporting (FIR)	Within **24 hours** after the occurrence of incident	IRIS and E- mail		Within **24 hours** after the occurrence of incident	IRIS and E- mail	
MINOR INCIDENTS	BU to develop their own internal procedures including **Lost Time Injury, Medical Treatment Cases, First Aid Cases, Near Misses, Unsafe Conditions, Unsafe Acts**						

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9.0 Reporting to External Authorities

The concerned location is responsible to communicate to Governmental Departments as required by the applicable laws and regulations and in prescribed forms and within stipulated timeframe.

10.0 Reporting of Emergency to External Authorities

The reporting of emergency incidents **(Level I Level II and Level III)** shall be as per ERDMP Regulations, 2010 and location's ERDMP.

11.0 Incident Investigation

All incidents regardless their classification in respective Category (i.e**. Minor, Serious and Major**) should be duly reported, recorded and investigated. However, the extent of incident investigation may vary depending upon the severity of incidents and associated property damage & financial losses.

11.1 Incident Investigation (Minor Incidents)

a. These incidents are those which are a lower level of risk and generally not Notifiable to external government agencies.

b. These incidents should be reviwed and investigated by operational line managers, officers, sectional/departmental heads to gather the details of the incident, identify possible underlying causes, review the hazard identification and risk assessment and undertake corrective actions.

c. BU/Locations are expected to define Incident Investigation and Management Guidelines/procedures for Minor Incidents based in their hierarchy, size and complexity of operations.

d. The recommended outline of incident investigation procedure for all "**Serious and Major"** Incidents is described in Section below.

e. However, BU/Locations shall develop their own procedure for **Minor Incidents**.

11.2 Incident Investigation (Serious and Major Incidents)

The following 6 Step procedure may be used by investigation team:

Step 1: Appointing Authority to constitute Investigation Team

Step 2: Collection of Facts by Investigation Team

Step 3: Determine Underlying Causes and Cause-Effect Relationship

Step 4: Determine Recommendations, Responsibilities and Timelines

Step 5: Prepare Detailed Investigation Report and Review by Appointing Authority

Step 6 : Report Distribution

Step 7: Follow up Action and Close Out

Refer **Appendix 1** for Indicative Incident Investigation Process Flow Chart.

11.2.1 Constitute Investigation Team

a. For all “Serious ” & “Major ” safety incidents, a trained Investigation Team Leader (who should not be from the location where the incident occurred) shall lead the investigation team.

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b. For all "Major " safety Incidents, representative(s) from Corporate HSSE shall be part of the investigation Team.

c. For "Serious " safety incidents, representative(s) from HQ HSSE shall be part of the Investigation Team, if deemed necessary.

d. Investigation Team shall be formed based on the initial assessment of the classification of the Incident. Team shall not be changed even if during the course of the investigation it is established that initial classification was not correct.

11.2.2 Appointing Authority

a. **SBU Head in consultation with ED- HSSE** shall be the appointing authority for all "Major" Incidents.

b. **Concerned SBU Head** shall be the appointing authority for all "Serious" Incidents.

NOTE : For investigating of fire incidents which are less than 15 minutes, the appointing authority shall be Regional Head.

c. Territory Manager/ Location Incharge shall be the appointing authority for all "Minor" incidents. The Minor incidents ,in general may not require a full team to examine root cause and prevention measures.

d. The Appointing Authority shall appoint the Investigation Team Leader, Investigation Team and Terms of Reference and time frame for report submission.

e. External Technical and Incident Investigation Expert(s) form outside BPCL may also be selected by appointing authority as investigation team member.

11.2.3 Collection of Facts By Investigation Team

a. After an incident is declared over, appropriate steps shall be taken to preserve the evidence. No material shall be removed from the location of the incident unless authorized by the investigation team leader.

Note: Serious and Major incidents may require investigation by external agencies and thus the scene of the incident should not be generally disturbed unless actions are required to help or removed trapped or injured persons. The locations shall be cleared for resumption of the work unless concerned government agencies inspect the locations and issue clearance.

b. Immediately after the incident, the concerned Area Supervisor shall barricade the area.

c. Investigation Team shall determine the resources required and the depth of the information collection. The collection of information required in order to establish facts relating to the investigation may include, but not limited to:

- Photos,
- Records and log sheets/ Job Safety Analysis/ Permit to Work Record
- Standard Operationg Procedures/ relevant plant operations parameters
- Test and Monitoring records
- Past incident reports
- Interviews with staff (Refer **Appendix 2** for Sample Interview Questions)
- Affected person & Witness statements

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- Video footage, if any
- Re-enactment (as long as it can be done without endangering life and safety and expected to understand the sequence of events and also after obtaining due written approval from Location Head)
- Drawings and diagrams
- Engagement of a primary technical specialist to report on evidence and establish the relationship of facts and falsehoods against a hypothesis.

11.2.4 Determine Contributory Causes and Causes & Effect Relationship

Incident Investigation Team shall select appropriate incident investigation tool to determine the contributory causes and establish Cause & effect Relationship including IRIS .

11.2.5 Determine Recommendations, Responsibilities and Timelines

Incident Investigation Team shall determine specific recommendations for prevention of recurrence of each cause ,define responsibilities for implementation and time lines for completion of closure actions.

11.2.6 Prepare Detailed Investigation Report and Review by Appointing Authority

a. A typical outline of the Final Detailed Investigation Report shall follow a format similar to given below:

i. Executive Summary.
ii. Description of Incident (Narrative).
iii. Observations and Evidence (Brief Analysis).
iv. Conclusions.
v. Recommendations, Responsibilities and Time Frame for Completion of Closure Action
Vi Appendices

- Duly filled First Information Report (as per IRIS).
- Duly filled Incident Investigation Team Leader's Preparations Checklist
- Duly filled Incident Witness Statement Form
- Duly filled Incident Interview notes/Checklist
- Cause-Effect Analysis. Schematics.
- Time Lines or Sequence of Events. Evidence Sorting.
- Photographs.
- Copies of log sheets and logbooks.
- Analysis Chart for the incident.
- Others.

b. Executive Summary shall contain a concise summary of what happened, conclusions about causes, and key recommendations to eliminate or minimize recurrence.

c. Recommendations shall state corrective actions for the root causes, and shall clearly relate to the causes.

d. Team leader to ensure that the Detailed Investigation Report for all Serious and Major Incidents is issued within **21 calendar days** after the date of incident.

e. Draft of Investigation report for all **Serious and Major Incidents** shall be thoroughly reviwed by Investigation Team , Concerned Installation Head, Section Head and Appointing Authority. **The Appointing Authority shall assign responsibilities and target dates to implement recommendations.**

11.2.7. Report Distribution

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a. Once completed, the Investigation Team Leader shall distribute the report to Installation Head, BU Head, BU HSSE and ED/GM HSSE and Other concerned Point of Contact (POC). The report should include clear recommendations and assigned responsibilities for completion of corrective actions and time frame.

b. The Detailed Investigation Report shall also be logged in IRIS system.

c. The original copy of the Detailed Investigation Report of all "Major" Incidents with all the appendices shall be submitted to the corporate HSSE.

d. Corporate HSSE shall establish a system for compiling the Detailed Investigation Reports for all "Major" Incidents received form locations and prepare a consolidated report for distribution among the SBU Heads and Board once in a year (April each year for last Financial Year).

11.2.8 Follow up Action and Close Out

a. BU/Locations shall establish a system shall be established to review the implementation of status of Corrective & Preventive Actions and close-out all the recommendations .

b. Management of change (MOC) procedures shall be followed for recommendations requiring changes.

c. Corporate HSSE Division shall verify the status of **"Major"** Incidents Investigation Report Recommendations and Follow-up action taken by conducting location audit.

d. BU HSSE Division shall verify the status of **"Serious"** Incidents Investigation Report Recommendations and Follow-up action taken by conducting location audit

12.0 Safety Incident Reporting and Analysis

a. Locations shall maintain /update their incident statics in the IRIS (**Refer Appendix 3**). BU / locations may define additional lagging indicators as determined by them.

b. ED/GM, Corporate HSSE shall analyze the Safety Incident Statistics and present to Corporate HSSE Committee Meeting.

c. Locations, BU and Corporate HSSE shall conduct following trend analysis of statistics as a minimum in

- Monthly Trend Charts
- Annually Trend Charts

The updated analysis should be available in Tables, Run Charts/ Bard Charts etc IRIS shall maintain factor wise analysis.

d. maintain Safety Incident Statistics for at least 10 Years.

12.1. Review

Corporate HSSE shall review this procedure once in 2 years and need based in consultation with BU HSSE Role Holders.

13.0 Definitions

Item	Definition

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Item	Definition
Accident	A specific unplanned event or sequence of events that has undesirable consequences.
Corrective Action	Action to eliminate the cause of an incident/ dangerous occurrences/near miss
Preventive Action	Action to eliminate the cause of / dangerous occurrences/near miss.
Direct Cause	The main cause that resulted in the incident/accident. The event, situation or condition that resulted in the incident/accident.
Fatality	Death resulting from work related injury/illness.
Incident	An event or chain of events which has caused or could have caused fatality, injury, illness, and/or damage (loss) to assets, the environment, company reputation or third parties. **(Note :** An incident where no injury, fatality or ill health has occurred , may also be referred as Near Miss, Close Call, near ht or dangerous occurrence).
Lost Time Injury (LTI)	An injury causing disablement extending beyond the day of shift on which accident occurred.
Lost Time Injury Frequency Rate (LTIFR)	The total number of Lost Time Injuries per million man hours worked during the period. Calculation = $\frac{\text{No. of LTI's (Own Employee + Contract). x 1,000,000}}{\text{Total Man Hours (Own Employee + Contract)}}$ Note : These can be calculated separately for own employees and contractors respectively.
LTI Severity Rate (LTISR)	The total number of man days lost per million man hours worked during the period. Calculation = $\frac{\text{No. of mandays lost (Own Employee + Contract). x 1,000,000}}{\text{Total Man Hours (Own Employee + Contract)}}$ Note : In case of fatalities or permanent total disability no lost workdays shall be reported.
Level-I Emergency Incident	This is an emergency or an incident which (i) can be effectively and safely managed, and contained within the location, location or installation by the available resources; (ii) has no impact outside the location or installation.
Level-II Emergency Incident	This is an emergency or an incident which – (i) cannot be effectively and safely managed or contained at the location or installation by available resource and additional support is alerted or required; (ii) is having or has the potential to have an effect beyond the location or installation and where external support of mutual aid partner may be involved;

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Item	Definition
	(iii) is likely to be danger to life, the environment or to industrial assets or reputation.
Level-III Emergency Incident	This is an emergency or an incident with off-location impact which could be catastrophic and is likely to affect the population, property and environment inside and outside the installation, and management and control is done by district administration. Although the Level-III emergency falls under the purview of District Authority but till they step in, it should be responsibility of the unit to manage the emergency.
Loss of Primary Containment (LOPC)	An unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials (e.g. steam, hot condensate, nitrogen, compressed CO_2 or compressed air). For drilling operations, any unplanned or uncontrolled release to the surface (seabed or ground level) should be included. LOPC is a type of event. An unplanned or uncontrolled release is an LOPC irrespective of whether the material is released into the environment, or into secondary containment, or into other primary containment not intended to contain the material released under normal operating conditions).
Man-hours Worked	The total number of employees hours- worked by all company employees and contractors' workman.
Man days Lost	It is the total disability / forced absence period in days of all the injured persons arising out of the major injury, serious injury and minor injury.
Near Miss	All incidents that did not result in but have the potential to result in undesirable consequences to personnel (injury/illness), and/or to the assets (damage/loss) or to the neighboring community and environment.
Occupational Incidents	Human injury accidents related to other than LOPC. The example included injuries resulted from fall from height, electrical shock, Slip, Trip, Cut Hit etc.
Process Safety Related Incidents	Incidents related to Loss of Primary Containment. Incidents related to exposure to unplanned release of chemicals from the containment (such as tanks, vessels, pipelines etc)
Reportable Lost Time Injury	An injury causing death or disablement to an extent as prescribed by the relevant legislation (This is taken as absence from work place more than 48 hours beyond the day of shift on which accident occurred).
Reportable Lost Time Injury Frequency Rate	The total number of Lost Time Injuries per million man hours worked during the period. Calculation = $\frac{\text{No. of RLTI's (Own Employee + Contract). x 1,000,000}}{\text{Total Man Hours (Own employee + Contract)}}$ *Note : These can be calculated separately for own employees and contractors respectively.*

14.0 Abbreviations

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BPCL	Bharat Petroleum Corporation Limited
BU	Business Unit
CSMS	Corporate Safety Management System
DIR	Detailed Investigation Report
ERDMP	Emergency Response and Disaster Management Plan
HOD	Head of the Department
FIR	First Hand Incident Report
HSSE	Health, Safety, Security , Environment
IRIS	Incident Reporting and Investigation System
ISO	International Organization for Standardization
IS	Indian Standards
LSR	Life Saving Rules
LTIFR	Lost Time Injury Frequency Report
LOPC	Loss of primary containment
RLTIFR	Reportable Lost Time Injury Frequency Report
MOC	Management of Change
MAH	Major Accident Hazard
MIS	Management Information System
SMS	Safety Management System
TS	Technical Standard

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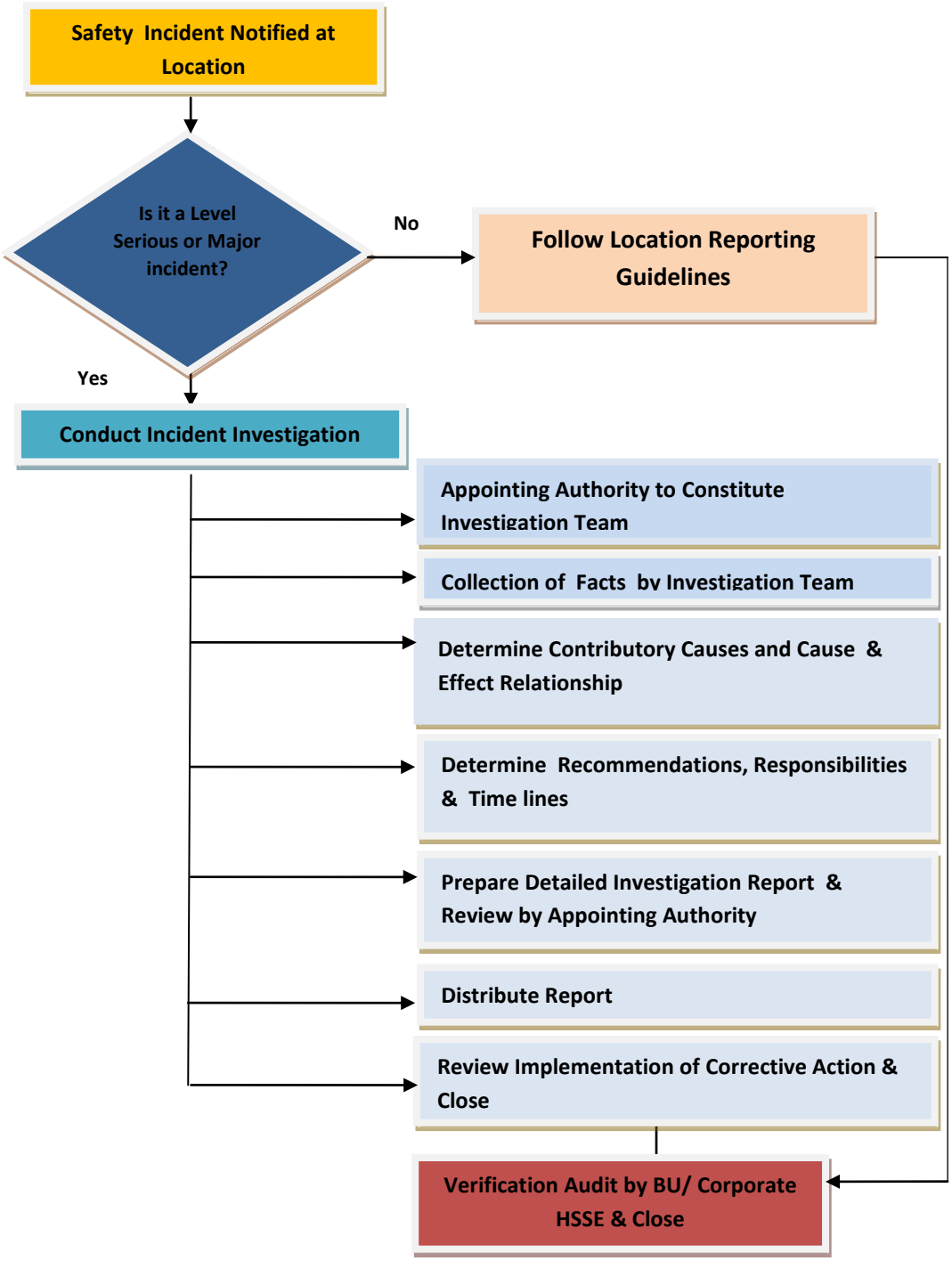
Appendix 1: Incident Investigation Process Flowchart



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Appendix 2: Sample Interview Questions

1 Explain him the purpose of incident investigation
2 Where were you before the incident happened?
3 Where were you at the time of the incident?
4 Who were present at the location, when incident happened?
5 What were the working conditions like (workplace and weather) ?
6 What you saw and did, who else was involved?
7 What was the time and what happened after the incident?
8 Is anyone else witnessed the incident?
9 Types of equipment/tools involved?
10 Location of: anyone involved, hurt, equipment, materials?
11 Operating conditions before and after?
12 What other people were doing?
13 Names of people involved / hurt?
14 Emergency response actions?
15 Anything moved, repositioned? (to control situation / emergency response)
16 Whether it was a permit to work activity?
17 Positive Isolation / LOTO was implemented?
18 Did you receive job training?
19 Do you have suggestions for improvements?
20 Thanks for valuable input

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Appendix 3: Corporate Level Lagging Safety Performance Indicators (Level 1)

No	Type/ Category	Corporate Level Lagging Safety Performance Indicators (Level 1)	Unit of Measurement	Target	March		April	FY
1	A. SAFETY GOVERNANCE	1.Total Man Hours Worked in the reporting period	Man Hours					
		2.Employee Man Hours Worked in the reporting period	Man Hours					
		3.Contractors Man Hours Worked in the reporting period	Man Hours					
		4.Total Man Hours Lost in the reporting period	Man Hours					
		5.Number of Incidents having Cumulative man hours lost more than 500 hrs	Numbers					
		6.Total Incidents	Numbers					
		7.Major Incidents	Numbers					
		8.Serious Incidents	Numbers					
		8.Minor Incidents	Numbers					
3	B.OCCUPATIONAL SAFETY COMPLIANCE*	9.Fatal Incidents						
		10.Reportable Lost Time Injury Incidents	Numbers					
		11.Lost Time Injury Incidents	Numbers					
		12. Reportable Lost Time Injury Frequency Rate (RLTIFR)	Numbers per million man hours					
		13.Lost Time Injury Frequency Rate (LTIFR)	Numbers per million man hours					
4	C. PROCESS SAFETY COMPLIANCE**	14.Fatal Incidents due to chemical fire/ explosion/ Toxic releases	Numbers					
		15.Fire for more than 15 minutes	Numbers					
		16.Explosion	Numbers					
		17.Property loss Incidents causing above Rs 10 Lacs	Numbers					
		18.Plant Shot Down/ Outage Incidents	Numbers					
5	E.MARKETING SAFETY INCIDENTS	19.Marketing Fatalities	Numbers					
		20.Fatalities at Customer Locations	Numbers					

Note : BU/ locations may add additional lagging indicators for their internal analysis and use.

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Bharat Petroleum

energising lives

BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Behaviour Based Safety

(BPCL/CSMS/TS/10)

Approved By	**ED,Corporate -HSSE**
Issued By	**GM, Corporate -HSSE**
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1.0 Purpose

BPCL has developed a structured corporate safety management system which defines specific requirements for managing OHS risks across its operations in accordance to its HSE policy and stakeholders expectations. The **Element 6: Implementation, Monitoring and Performance Reporting** of this framework requires that each BPCL BU/location establish an appropriate Behavioural based Safety Program to continuously identify Potential at risk behaviours & their management. Behavioural Based Safety training shall also be regularly provided to relevant staff including line officers/supervisors.

Heinrich's Accident Triangle showed that, of 330 workplace accidents, 1 would lead to a major injury, 29 would lead to minor injuries, and 300 would be due to at-risk behaviours. Therefore, there is a need to prevent such hazardous situations/ at-risk behaviours from arising before they lead to accidents or injuries.

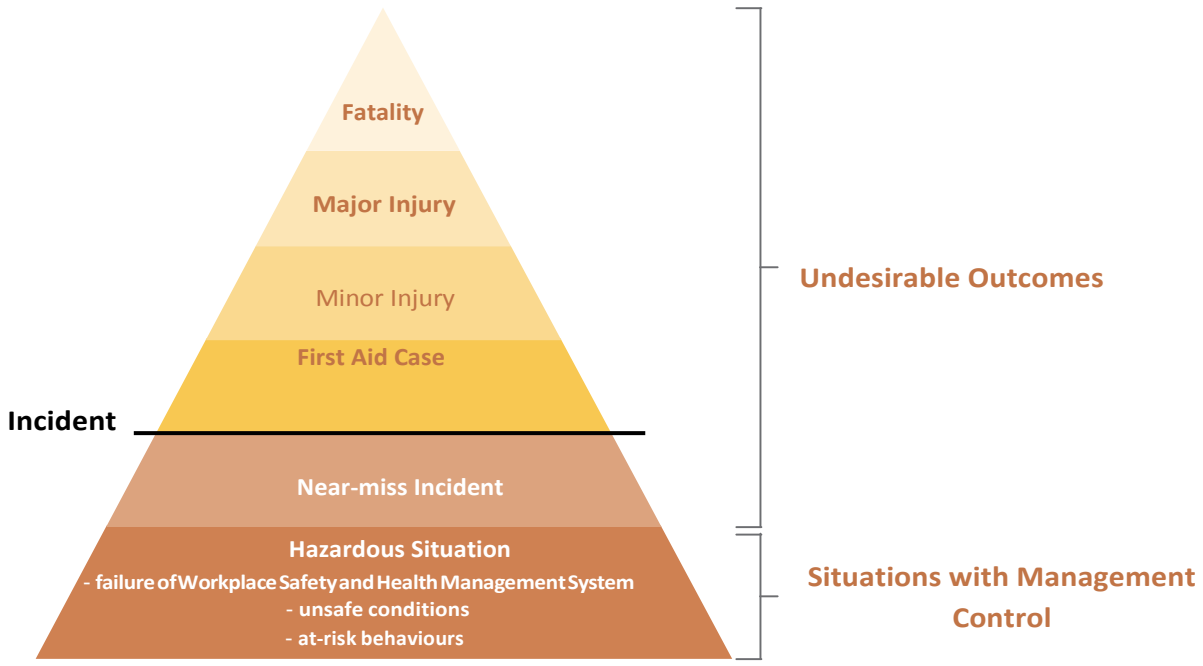

Figure 1: Injury pyramid based on Heinrich's Accident Triangle.

Behavioural Observation and Feedback is a simplified behavioural safety initiative each BPCL BU may adopt to demonstrate care for its employees, instill in them safe work practices, and reduce the incidence of at-risk work behaviours. This standard outlines the minimum requirements for effective design & implmentation of its BBS process in combination with existing safety management processes.

Note : BUs are recommended to develop suitable BBS program based on their needs/risk assessments and at risk behaviours specific to their operations and roll down across the BU in time bound manner.

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BBS Program Requirements

The provisions of the BBS standard require each BPCL BU/ Location to:

a. Assign roles, responsibility and accountability for personnel involved in implementing the BBS program
b. Define and establish a planned safety observation methodology to gather information regarding safe & At risk behaviours/ conditions, recording & analysis of data and establish improvement objectives
c. Identify and gradually remove personal and systems barriers responsible for unsafe acts, behaviours and conditions and establish accountability
d. Provide education and training to employees on Behaviour Observation & Feedback Process
e. Include and involve all contractors in the BBS Program
f. Periodically evaluate the effectiveness of site BBS program
g. Review and communicate the KPI's during site level review meeting
h. Review by Location HSSE Committee and BU Head to ensure continual improvement

The purpose of this standard is to define roles, responsibilities & safety observation methodology to drive & maintain a positive safety culture in BPCL . ***Each BPCL location is recommended to implement a structured BBS program as a part of their safety management systems.***

2.0 Scope

This Technical Standard applies to all BUs and their locations including project sites unless not excluded by Corporate HSSE .**All management staff shall be required to participate in Behaviour observation & feedback program to get its maximum advantage**.This applies to all employees, contractors and subcontractors.

3.0 References

BPCL HSE Policy
BPCL Corporate Safety Management System

4.0 Responsibilities

Corporate HSSE shall be responsible for

- Development of BPCL Technical Standard on Behaviou Based Safety
- Appointing a Corporate BBS Lead from Corporate HSSE . He shall drive BBS across BUs and mentor BU BBS Design Teams.
- Collecting key BBS performance parameters from BUs

BU Heads shall be responsible for developing BU specific BBS Program and roll down in all BUs in time bound manner / Periodic Monitoring (Refere Appendix 1 for further Guidance on Roles and Responsibilities).

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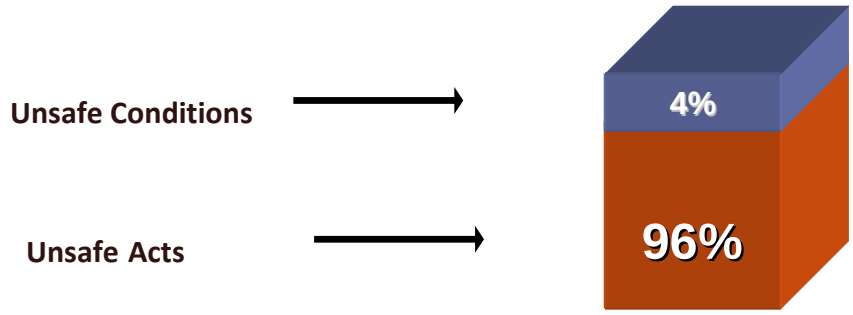
Location Heads shall be responsible for implementing BU BBS Program in their respective location and periodic monitoring (Refere Appendix 1 for further Guidance on Roles and Responsibilities).

5.0 Guidelines for Development of BU Specific Behavior Based Safety Program

5.1. Cause of Injuries

We observe from the picture below that 96% of injuries occurred due to unsafe act. If we make safety observations a regular habit and improve the safe working culture, we can achieve the target of zero harm sooner.



It is observed from the above picture that 96% of injuries occurred due to unsafe act. If we make safety observations a regular habit and improve the safe working culture, we can achieve the target of zero harm sooner.

5.2. Behaviour-based safety Program

Behaviour based safety program are people-focused processes and incorporate one-to-one or group observations of work behaviours while employees performing routine / non routine works and giving pro active feedback on observed behaviours i.e. **Safe & At risk behaviours,** coaching and mentoring. The data is captured using an observation checklist and analyzed to remove the barriers for at risk behaviours. The results are shared with team members and safe behaviours are reinforced. The BPCL BBS is a proactive process encouraging individuals and their work groups to actively focus upon their own behaviour as well as of their team members . BPCL BBS is built on fundamentals of **A**ntecent-**B**ehavior-**C**onsequence Model. **However, it is stressed here that BBS is not a standalone program but compliments BPCL existing safety management processes. To be fully effective it warrants involvement of all levels of organization in observation and feedback process in particular frontline staff.**

5.3. Benefits of Behavioural Observation and Intervention ?

Beyond increased productivity and improved safety performance, Behavioural Observation and Intervention is a significant step to establish a positive safety culture where employers and employees care for one another, exercise teamwork, and take greater ownership of their actions and those of their colleagues.

Other benefits of implementing Behavioural Observation and Intervention include:

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- Behavioural Observation and Intervention to help BUs minimise the occurrence of hazardous situations allowing management to demonstrate commitment to safety;
- enabling two-way safety communication between the workforce and management and between employees;
- engaging employees in matters pertaining to safety;
- empowering employees to act promptly in response to at-risk behaviours; and
- creating greater awareness of the impact of human factors on safety

5.4. Participation

BBS program requires **periodic safety observations** of employees by their managers/supervisors and peers. These Scheduled Safety Observations should be performed and documented by all levels of management cadre employees at the BU. Safety Observations are more effective if it is carried out along with direct reporting subordinate or area in-charge where observation is being carried out. It should never be carried out in a group of more than three people. The aim is to coach and nurture direct reporting subordinate and at the same time, area in-charge will be aware about issues identified during safety observation at site.
Management cadre employees involved in Safety Observations include:

- Chairman
- Directors
- SBU Heads
- Executive Director
- General Managers
- Territory Managers
- Engineers
- Safety Professionals
- Contractors supervisors

Minimum 01 number of Safety Observation Rounds to be carried out by all the level of management and superisory functions employees. Later on management can reduce / increase the frequency of this safety observation rounds based on the progress study requirements.

5.5. The Safety Observation and Intervention/Feedback

The Safety Observation will consist of scheduled time in the field when the Safety Observation is solely focused on observing people working at their workplace. Discussion on issues other than safety should be avoided during safety observation round. This could be in the plant facilities including material loading/unloading activities, Offices (on site/off-site), Township, and Cafeterias etc. As mentioned, the primary focus is observing behaviour in the work place but conditions should not be ignored.

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During this process, the Safety Observation and feedback process should be used to reinforce positive acts and behaviours, discuss unsafe acts (with focus on the consequences) and behaviours, and discuss other safety-related issues. Each Safety Observation round will typically have multiple observation contacts and each observation contact should ideally be for around 15-20 minutes to keep the process effective.

The Safety Observation process differs from others because it explicitly recognizes the positive/safe behaviour as well as the unsafe behaviour/ concerns. The entire discussion is meant to be a constructive way to talk to employees about the safety of their work: acknowledging safe work, correcting unsafe work habits and resolving issues, if any.

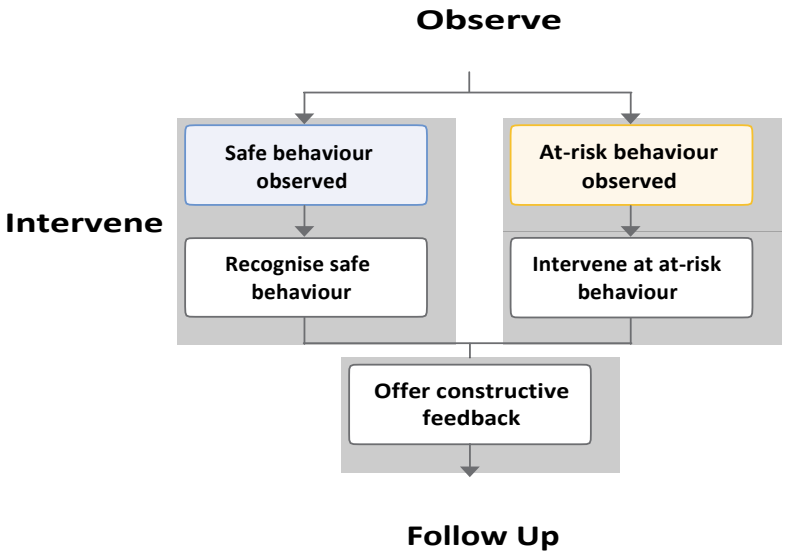

Figure 2: Observation and Intervention/Feedback Process

5.6. BBS Administration Structure

The Five Tier BBS Facilitation Structure at BU level may include:

- BU Head
- BPCL Corporate HSSE-BBS Lead (Nominated by ED-HSSE)
- BU BBS Lead (Nominated by BU-Head)
- BU- BBS Design Team
- Location Head and HSE Committee
- Location BBS Coordinator (Nominated by Location Head)
- Departmental BBS Observers

Refer **Appendix 1** for Guidance on BBS administration structure and **Appendix 2** for Roles & responsibilities.

5.7. Roles & Responsibilities

Refer **Appendix 2** for Guidance on BBS Roles & Responsibilities as per above structure.

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5.8. Selection of BBS Observers

Location safety committee shall issue a notification to define who shall conduct safety observations and frequency **.** However, it is recommended that all the BPCL management staff at locations is recommended to participate in location's behaviour observation & feedback program to get its maximum advantage.

5.9. Frequency of Behavioural Observations

Location safety committee shall define the frequency for safety observations and frequency **.** However, it recommended that the frequency of safety observation round must be at least one safety observation per month for all observers regardless their levels.

5.10. Planning of Observation System

Scheduled Safety Observation Rounds shall be performed and documented by all BBS Observers. Location Safety Committee may shall guide on monthly observation plan**.** The purpose of monthly observation plan is to distribute observations in uniform manner and based on site needs. For example:

- Joining of new contractor
- High hazard activities
- Distribution of observations as per work shifts
- Any concern area requiring more focus

5.11. Developing Behaviour Observation Checklist/ Form

All observation shall be conducted using **Behaviour Observation Checklist**. BU Design Team shall develop a suitable Behavioural Observation Checklist for use in their BU. Safety Observations should focus on all behaviours that have the potential for injuries. Results from previous injury investigations, from previous near miss investigations, and from previous observations should be used to focus the effort. Refer **Appendix 3** on behavioural observation categories ,which may be considered by the design team in developing BU Behavioural Observation Checklist.

The observation Form shall be made readily available at select places in the site.

Prior to going for safety observation in a particular area, the observer should study the previous observation reports, open points and action taken by the section/area to close the open points since last observation. The observer during the observation process should reinforce the efforts taken by section / area in improving the safety and also discuss the pending/open points.

5.12. Behaviour Observation Form Recording

All Safety Observations shall be specifically filled-in within 24 hours in the online Safety Observation Software by the concerned BBS observers himself. The description and recommendation for corrective action, if any filled in the software shall be automatically generated & forwarded to the process owner /reporting officer

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through online software. The process owner shall determine & be responsible for corrective actions in time bound manner as follows:

5.13. BBS Performance Matrix/ KPI

BBS performance may be assessed on a number of Key Performance Indicators. The following shall be minimum BBS- MIS KPIs .

A. % Observation Compliance
B. Total No of Unsafe Acts per observation hour
C. Number of Life Saving Rules Violations
D. Number of Actions closed
E. Number of Action Open

5.14. BBS performance review

Location HSSE Committee chaired by Location head shall review site BBS performance on identified KPIs ***at least once in a month***. The location BBS coordinator shall prepare Monthly MIS and Trend analysis against Performance KPIs. All functional heads shall own their data and corrective measures/ improvement objectives /removal of barriers to safe acts.

5.15. BBS Data Communication

Location BBS coordinator shall maintain clear & conspicuous BBS Score Board (At least 4 Feet × 3 Feet size) at appropriate place in the respective sections to provide results of safety observation and safety communications to observees. The BBS Communication Board may include information on BBS Performance Matrix (KPIs); Trends, Success, Challenges and photos of well performing observers and observees.

5.16. BBS Observers Training

Location Heads are responsible and accountable to ensure all the observers are trained to conduct effective Behaviour Observations as per the monthly observation plan. HR department shall maintain a list of BBS Trainers for providing class room and site training. Head-HR shall facilitate the training program and review the effectiveness of the program. Training records shall be maintained by HR

5.17. Induction of New BBS Observer

Any new observers shall be inducted based on at least half day class room training and minimum 3 observations under trained observers. No new observers shall be inducted without this training.

5.18. Implementation strategies to consider

- Obtain top management support for the Behavioural Observation and Intervention. All employees must embrace safety as a value, lead by example, and believe in the benefits of the initiative prior to the implementation of the initiative.
- Set up a BU BBS Design Team to drive the initiative and oversee its implementation.
- Position Behavioural Observation and Intervention as part of larger safety initiatives involving capability development and culture building.

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- Communicate the Behavioural Observation and Intervention approach and its underlying principles to all employees BU/Location-wide.
- All employees to own and drive the Behavioural Observation and Intervention process by granting them the authority to act on safety concerns, so that they may proactively contribute towards safety.
- Provide training for safety coaches-to-be in three key areas: basic BBS process knowledge, observation skills, and coaching skills.
- Instead of a long checklist, keep behavioural observations short by focusing only on a few critical behaviours at a time.
- Ensure that the Behavioural Observation and Intervention approach emphasizes the positive reinforcement of safe work behaviours. Encourage safety coaches to give recognition on-the- spot whenever it is due. When handling at-risk behaviour, immediate intervention is necessary only when the at-risk behavior observed may cause a hazardous situation which can lead to a workplace accident or injury.
- Emphasize that the observation and feedback process must not be conducted in a confrontational manner, as it is not an inspection or audit.
- Progress from supervisor-to-worker to peer-to-peer observations, announced to unannounced observations, and intra-dept to inter-dept observations as the safety culture of the company mature.
- If quantitative results are required, identify simple ways to measure the performance of the BO&I initiative as the journey progresses, such as measuring the percentage of employees participating as safety coaches, frequency of observations, number of interventions, number of safe versus at-risk behaviours recorded, percentage of safe behaviours, and so on. However, beyond statistics, the initiative should focus on improving employee-employee interaction, raising safety awareness, and effectively using observation findings as opportunities for safety improvement.
- Continually evaluate and refine the Behavioural Observation and Intervention (e.g., once a year, but more frequently during the first year it is implemented).As the BU's safety culture matures, consider extending the Behavioural Observation and Intervention to include participation from all persons at the workplace (e.g., contractors, vendors and suppliers) as part of corporate social responsibility and to drive further safety improvements.
- The typical examples of barrier in safe behaviour may include :
  - inadequate standards
  - inadequate trainings
  - improper design and operations of equipments
  - inadequate procedures
  - lack of communications
  - lack of resources such as tools / PPE's

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- lack of Physical fitness
- lack of personal motivation etc.

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5.19. Quality Assessment of Observation Process

These BBS Trainers shall also conduct assessment of BBS observation process to establish quality and to ensure that all observers follow 6 step processes effectively. Location BBS coordinator shall make plan for quality assessment using BBS Trainers.

5.20. Recognition Policy

Location HSE Committee shall notify recognition criteria , frequency and methods for recognition of select numbers of best Observers, Observees and area. The criteria may include

- Self Injury Record
- Monthly Observation Compliance
- Quality of Observation and Feedback
- Number of Unsafe Acts/ Unsafe Conditions reported per safety observation round
- Any high impact personal initiative to promote behavioural safety at respective location

5.21. Review

The standard will be revised and renewed minimum once in a two year by BPCL corporate HSSE.

5.22. Definitions

Definitions	
At Risk Behaviour (ARB)	An ARB is defined as any act that deviates from a generally recognized safe way / rules/procedure or specified method of doing a job / Work permit process and which in turn ***unnecessarily*** increases the likelihood of risk. Also referred as ***Unsafe Acts***.
Behaviour	These are defined as actions/inactions of people, which are observable and measurable. From safety standpoint, behaviors are grouped in two classes (Safe behaviors or Unsafe behaviors). The unsafe behaviours are also termed as " At Risk Behaviors" (ARB).
Behaviour Based Safety Software	A software which will be used by nominated BBS observers for logging observation data, analysis and reporting corrective actions
Closed Action	These are corrective actions to address the identified cause(s) of Unsafe Acts/ ARB, which are taken by Observor/Observee or both at the site itself.
Life Saving Rules (LSR)	A set of rules defined by BPCL on high risk behaviours, if violated may result in fatality. Complying with these Life Saving Rules is absolutely mandatory for all BPCL employees of all levels, contractors, subcontractors , visitors and others. It is every one's responsibility to abide at all times by these Rules.

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	<u>Violation of any of these rules shall invite application of BPCL disciplinary policy and procedures.</u> **Violation is defined as willfully not complying the BPCL notified safety rules and as a result putting own life or someone else life into serious risk.** ***<u>Refer BPCL Life Saving Rules for further details</u>***.
Open Action	These are corrective actions to address the identified cause(s) of Unsafe Acts/ ARB, which can not be closed then and there by Observers and are typically system/ engineering/design issues.
Safety Contact	Safety contact is the process in which an observer conducts six step process of safety observation. Ideally one contact should be completed within 15 min. to maintain effectiveness of the process.
Safety Observation	Safety observation is a structured and planned pro-active two-way safety conversation process to • **Recognizing and reinforcing positive safety behavior** and Identifying and correcting at risk behavior • **Engaging in conversation regarding safety concerns or** issues
Safety Observation Card	List of Specific Behaviours identified for facilitating observations & provide feedback. All observers shall report the results on observation process in these card and log the data into the online Behaviour Based Safety software.
Safety Observers	Designated officials responsible for conducting planned safety observations and log the results of observation in BPCL BBS software.
Safety Observation Round	These are safety observation visits made by nominated observer at pre determined frequency.
BPCL BBS Design Team	A team of managers at plant level to plan safety observation processes and procedures, performance measurement system, communication strategy, innovation and advise BPCL Plant safety Committee on robustness of BBS program.
Unsafe Condition	Any physical condition, which may lead to an incident or injury if remain uncorrected or unaddressed. These conditions may be due to design, maintenance operational error.

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5.23. Abbreviations

ARB	At Risk Behaviour
ABC	Activator- Behaviour -Consequence
BBS	Behaviour Based Safety
CSMS	Corporate Safety Management System
LSR	Life Saving Rules
MIS	Management Information System
SOR	Safety Observation Round
UC	Unsafe Condition
UA	Unsafe Act
WPS	Work Permit System

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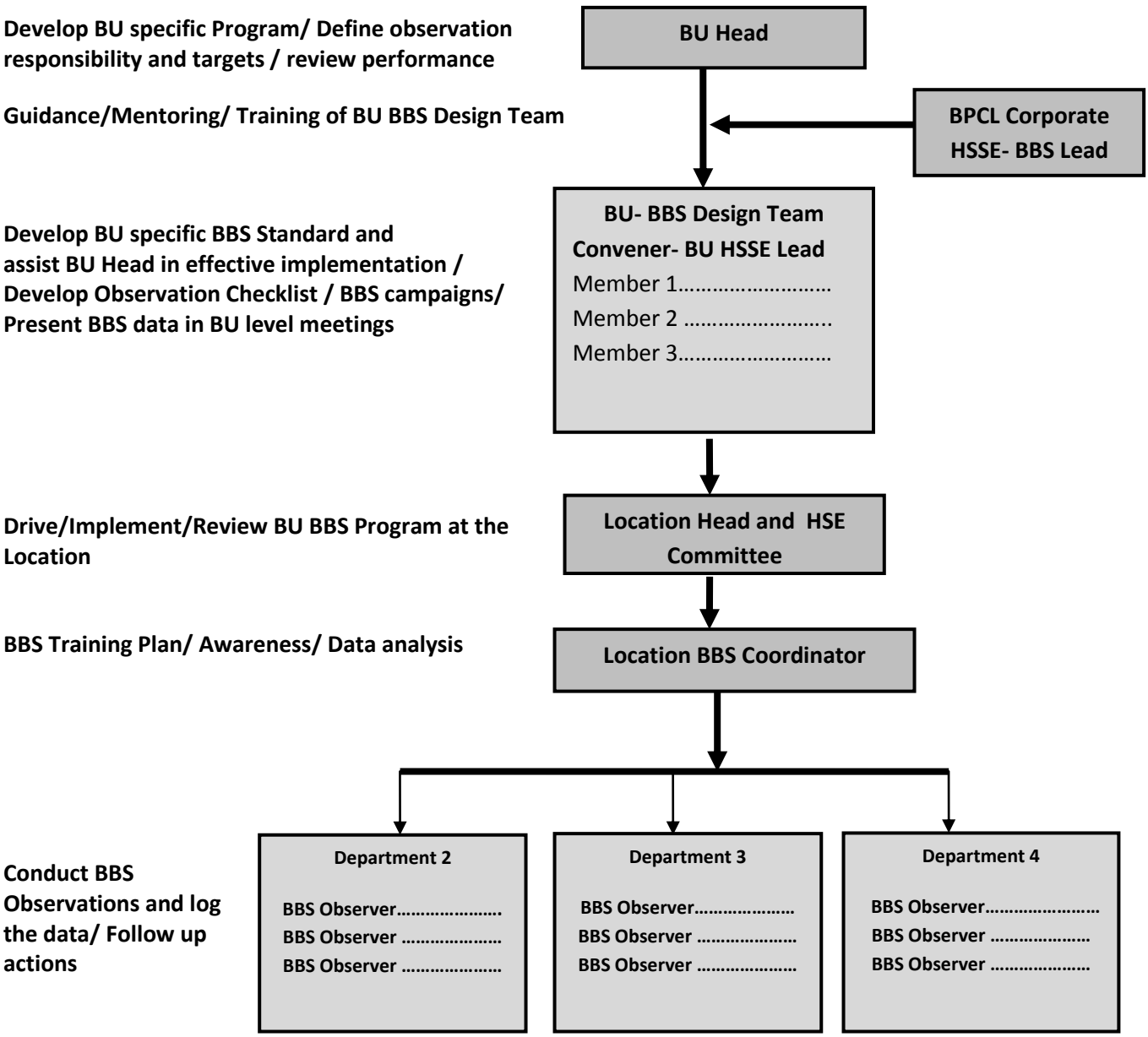
Appendix 1: BBS Program - Administration Structure



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Appendix 2: BBS Program - Guidance on BU Level Roles and Responsibilities

Level	Role	Responsibilities
BU- Head	Development of BU specific Program and roll down in all BUs in time bound manner / Periodic Monitoring	1. Appoint a BU BBS Lead 2. Constitute BU Specific Design Team (3-4 members) 3. Approve BU specific documented BBS Standard as developed by BU BBS Design Team 4. Provide resources for BBS implementation 5. Set Observation targets for all levels of management staff in BU 6. Provide a behavior measurement and analysis tool /software 7. Review and monitor the Behavior Observation Data periodically in BU performance review meetings . BU BBS design team to present the Behavior Observation Data in performance review meetings. Note: Refer Appendix 1 for an illustrative BBS Administration Structure at BU level.
BPCL Corporate HSSE - BBS Lead	Custodian of Corporate BBS Program	1 Guidance /Mentoring/ Training to BU- BBS Design Team 2 Participation in BU BBS performance review 3 Sharing BBS best practices across BUs and outside 4 Periodic Audit of BU BBS program 5 Assist BUs in developing BBS program management capabilities
BU HSSE Lead	Custodian of BU BBS Program	1. Guidance /Mentoring/ Training to Location- BBS Coordinator 2. Location BBS performance review 3. Sharing BBS best practices within BU 4. Periodic Audit of Location BBS program 5. Assist Location's in developing BBS program management capabilities
BU BBS Design Team **Composition :** 3- 4 Members Team at Each Location consisting of A. Representative from Operation B. Representative	Develop BU specific BU Process and Technical Assistance/Advise for implementation to BU Head	1. Develop and Notify a BU specific documented BBS Standard with approval from BU Head 2. Development and modifications in Observation Checklists based on Critical Behaviour Analysis 3. Monthly BBS KPI Data Collation and Analysis using BBS Software for their respective scope and presentation to plant committee 4. Maintain BU specific BBS KPI score board 5. Assist BU Head in BBS awareness, implementation and supporting policies 6. Maintain BBS training plan in their respective BUs

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from Maintenance C. Representative from HR D. BU-Corporate HSSE Role holder as convener		7. Internal/External Audit of BBS Program in their BU 8. Drive BBS Campaigns
Location- Head	Development of Location specific BBS Program based on BU Design Team Guidance	1 Appoint a Location specific BBS champion. 2 Provide resources for BBS implementation 3 Review and monitor the Behavior Observation Data periodically in Location HSE Committee Meetings . Location BBS champion to present the Behavior Observation Data in performance review meetings. Note: Refer Appendix 1 for an illustrative BBS Administration Structure at BU level.
Location HSE Committee	BBS Strategy Planning & Oversight	1. Demonstrate Commitment to BU/Location BBS Program 2. Monthly Performance Review of BBS KPIs 3. All HSE Committee members to conduct at least one Safety Observations as per defined targets & log the data in BU BBS Software 4. Approve & Implement Recognition of good observers 5. Implement Disciplinary Policy for LSR Violations
Location BBS Coordinator	An official nominated by location head to act as a BBS Point of contact	1 Custodian of BBS Process 2 Notify monthly BBS observation plan 3 Monthly analysis of BBS Data and present to location safety committee 4 Maintain BBS performance communication board 5 Conduct regular BBS Campaigns 6 Continually Improve the process
Location BBS Observers	All Management and supervisor staff at Location	1 Participate in BBS Training and understand BBS Process **2** All Nominated Safety Observers to conduct *at least one safety observation* per month & log the data in BPCL BBS software**.**

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All Operators & contractors workman	Observee	1. Support behavioral observation process 2. Intervene, when observed any unsafe act / Life Saving Rule violations in proactive manner 3. Identify barrier for safe act and correct it 4. Reinforce safe behaviors of self and other 5. Comply BPCL Life Saving Rule

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Appendix 3 : Guidance for Development of Behavioural Observation Checklist

A behavioural checklist is used to facilitate on-site job-specific observations and allow safety coaches to distinguish between safe behaviours and at-risk behaviours. Behavioural checklists may be developed for a particular work location and/ or workplace activity.

The checklist form may have a dedicated space for recording the BBS observer's name. However, there should be no space allocated for the name of the person(s) being observed.

Critical at-risk behaviours (for inclusion as possible checklist items) may be ascertained from any of the following:

- causal analysis of past accidents;
- in-depth reviews of near-miss incidents;
- studies of critical operating procedures;
- carrying out site inspections; and
- interviewing the employees

Suggested categories for a behavioural checklist

Reactions of People

During the observation it is necessary to observed how the person reacts after seeing the observer. On the base of reaction the observer can assess the person's attitude. Reaction will indicate the consciousness of the worker.

Positions/Actions of body

Observer should see the Position of the person while taking observation. Position/Actions of the person may be in the form of sitting, standing, lowering, location, place, height etc.

Personal Protective Equipment

Observer must see clothing is properly worn and Personal Protective Equipments (PPE) is as per the job requirement and it used properly.

Tools and Equipment

Are the proper tools being used? Are they being used correctly? Are they in good condition? Are "homemade tools" being used?

Procedures

Are adequate procedures in place? Are they understood and being followed?

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Orderliness Standards (Housekeeping)

Is the work area orderly? Is the area is clean and properly arranged?

Each of these categories may further be divided in sub categories and it is expected to refer to these details while carrying out the safety observation.

It is also important that potential consequences of identified unsafe acts / unsafe conditions are identified and noted. This will help to have bigger picture of potential injuries. The potential consequences may be categorized as potential fatality, potential serious injuries (causing lost time case) or potential minor injuries (requiring medicinal help or first-aid)

All observed unsafe acts, behaviours, and conditions in any area or location must be corrected immediately at site wherever possible while pending issues must be addressed and acted up on priority basis. *Looking the other way is a passive form of approval of the situation prevailing in the area.*

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Bharat Petroleum

energising lives

BPCL CORPORATE SAFETY MANAGEMENT SYSTEM

Technical Standard on Corporate Safety Management Systems Audit

(BPCL /CSMS/TS/11)

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Issued By	**GM, Corporate -HSSE**
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Document History		
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1. Purpose

BPCL has a developed Corporate Safety Management System (CSMS) which defines specific requirements for managing OHS risks across its operations in accordance to its HSE policy and stakeholders expectations. The **Element 7 of Corporate Safety Management System : Safety Assurance** prescribes that a compliance assurance programme shall be in place to review and verify effectiveness of the safety management system. It shall at least include:

- Internal Audits by the Location/ BU
- External audit by OISD and other third party audits
- External Certification Audits
- Corporate Safety Management Systems audit
- Process Safety Audits
- Special audits such as electrical safety, IS 14489 audits etc.

This Technical Standard outlines Corporate Safety Audit programme and procedures to determine that :

A. Location's Safety Management System conforms to corporate safety management system requirements;

B. Has been properly implemented and maintained;

C. Has opportunities for improvement in safety performance through a structured review of existing procedures and performance

D. Provide a quantitative rating on Location's SMS performance base on predefined criteria

E. Provide information on the audit results to the BPCL Corporate HSSE Council.

2. Applicability

The Technical Standard applies to Level 1 Audit to be planned, executed and monitored by Corporate HSSE to verify the design, implementation and effectiveness of Corporate Safety Management Systems. It is intended to include all BUs every year under Annual CSMS programme . The number of installations/locations may be selected based on the guidance below:

Name of BU	**Indicative Number of Locations to be covered under Annual CSPM Audit Programme**	**Remarks**
Retail	**8**	**4 Number of Installations of capacities ≥ 30000 KL** **4 Number of Installations of capacities < 30000**

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		KL
Refinary	**2**	**One Number of CSMS Audit in every two year unless no special circumstances are there**
LPG	**6**	**3 Number of Installations of capacities ≥ 60000 MTPA** **3 Number of Installations of capacities < 60000 MTPA**
Aviation	**2**	**1 Number of installation having Annual Sales ≥ 40000 KL per Annum** **1 Number of installation having Annual Sales < 40000 KL per Annum**
Lubes **Lubes Depos**	**1** **4**	**1 plant and 1 depo in each region**
E & P	**2**	**Major Project-1** **Minor- 1**
Pipelines	**2**	**Any Two Pipelines**

Note : The total number of representative locations for first two years shall be decided by CSMS managers and may be limited to maximum 16 .

These audits shall be conducted by a pool of trained auditors as enlisted by GM Corporate-HSSE. This may include about 20 lead auditors and 40 auditors.

3. References

BPCL HSE Policy
BPCL Stretegic Objectives
BPCL Business Plan
BPCL Life Saving Rules
BPCL Corporate Safety Management System System
BPCL Technical Standards

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OISD Standards as related to project activities
ISO 19011:2011 Guidelines for quality and/or environmental management systems auditing
OHSAS 18001:2007 Occupational health and safety management systems - Requirements

4. Responsibilities

The overall responsibility for establishing and maintenance of a Corporate Level Safety Management System Audit Program shall rest with Corporate GM- HSSE . His key roles and responsibilities shall include:

- Designate a Competent **Corporate - CSMS Audit Manager** at Group Level in consultation with ED -HSSE;
- Establishing a representative **Annual CSMS Audit Plan** in consultation/ approval with ED HSSE;
- Implementing the Annual CSMS Audit Plan;
- Monitoring & reviewing the Annual CSMS Audit Plan;
- Review and analyse audit findings to ED HSSE (ED - HSSE shall report to BU Head and BPCL Corporate HSSE Council
- Improving the audit procedures;
- **Develop a 5 Day BPCL In-house Internal Course on Safety Management Systems Auditing along with Examination/Qualifying Criteria.**

  (Note : For year one ot two , the lead auditor and auditors may be selected based on successful completion of IRCA , UK Registered lead auditor/auditor Course (5 Day) or equivalent auditor's qualification course as prescribed by Corporate GM- HSSE in consultation with ED-HSSE).
- Maintain a trained cader of Internal CSMS auditor (Minimum 20) based on successful completion of above 5 Day BPCL Internal Course on SMS and their continuing competency development A **"List of approved CSMS auditor**" shall be maintained by GM-HSSE;
- Appointing, if required, an independent expert/reviewer for professional assistance on audit .
- Any other as appropriate.

Corporate - CSMS Audit Manager

He shall be responsible for

- Assisting GM-HSSE in establishing a risk based annual audit program;
- Selecting representative BUs and their respective locations to be included in every year annual audit programme;

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- Implementing audit program;
- Appointing Lead Auditor and team members based on the location size and risk level;
- Evaluating and developing auditors;
- Reviewing and improving audit program;
- Approving the Terms of Reference (ToR) for audit and the Audit Report;
- Performing supervisory oversight of Audit Teams;
- Providing periodic analyses/reports to the GM-HSSE for Level 1 Audit;
- Monitoring the quality of audit delivery;
- Any other responsibility as assigned by Corporate GM- HSSE.

CSMS Lead Auditor

He shall be designated by **Corporate - CSMS Audit Manager;**

- Leading the Audit Team and managing the audit delivery process to achieve stated deliverables, according to the scope and time estimate in the agreed ToR;
- Reviewing the audit work carried out by the Auditors and ensuring that Auditors properly conclude on the work performed;
- Acting as the primary contact for the Auditee;
- Preparing the ToR in consultation with Concerned BU -HSSE Role Holder and Corporate - CSMS Audit Manager. The ToR should specify the following as a minimum:
    - Name of BUs
    - Location's to be audited
    - Audit Objectives
    - Scope of the Audit
    - Timing and duration of Audit
    - Name and position of the Principal Auditee
    - Audit Team Leader
    - Audit Team Members
    - Audit Methodology
    - Audit follow up coordinator
    - Audit report Distribution
- Forward the ToR to auditee representative;
- Prepare audit plan and sent to auditee representative at least 21 days in advance;

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- Submit the Audit Report to BU Head, Corporate - CSMS Audit Manager, and Concerned BU -HSSE Role Holder;
- Ensuring full compliance with the ToR and this procedure in all steps of the audit Process;
- Confirming audit dates, duration and resource requirements with Auditee;
- Any other responsibility as assigned by Corporate - CSMS Audit Manager.

CSMS Auditor(s)

- Preparing and participating in the audit teams;
- Carrying out allocated audit work and taking responsibility for the work carried out;
- Submit the audit findings to Lead Auditor within 3 Days of completion of site audit;
- Fully complying with the Audit ToR and in all steps of the audit Process;
- Any other responsibility as assigned by lead auditor.

Independent Expert/ Reviewer

Reviewing the Terms of Reference (ToR) for the audit, the Audit Programme , On- site assistance and the audit report, ensuring that the audit assessment and audit findings are sufficiently substantiated and is responsible for issuing an Independent Review to the lead auditor before close out meeting.

Auditee Representative of the BU

- Reviewing and agreeing the ToR and the plan for the audit
- Nominating audit facilitator and follow up coordinator
- Supporting the audit process, ensuring availability of people, access to facilities, documents and records for the audit
- Attending opening and closing meetings
- Considering audit recommendations, identifying actions to address the root causes of the findings, action parties and target dates.
- Ensuring that the agreed actions are closed as per plan

5. Auditor Selection Criteria

GM-HSSE shall maintain a trained cader of **Internal CSMS auditor (Minimum 20 numbers**) based on selection criteria and ensuring their continuing competency development. These auditors may be drawn from operations, maintenance, HSSE functions of corporate, BU and locations

The minimum requirements to qualify a Corporate SMS Auditor are:

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A. Demonstration of sound knowledge of Corporate Safety Management Systems and Technical Standards;
B. Adequate independence from the BU being audited, to enable objective and impartial judgment;
C. Successful Completion of **IRCA , UK Registered Lead Auditor/Auditor Course or 5 Day BPCL Internal Course on SMS Auditing or any other auditing course as prescribed by GM-Corporate HSSE ;**
D. Participation in at least two corporate SMS audit as a team member under supervision of a lead auditor;
E. Feedback from the auditee.
F. Deemed to be competent to be an audit team member by the **Corporate - CSMS Audit Manager.**
G. Minimum work experience of 5 years

The minimum requirements to qualify a Corporate SMS Lead Auditor are:

A. Demonstration of sound knowledge of Corporate Safety Management Systems and Technical Standards;
B. Adequate independence from the BU being audited, to enable objective and impartial judgment;
H. Successful Completion of **IRCA , UK Registered Lead Auditor/Auditor Course or 5 Day BPCL Internal Course on SMS Auditing or any other auditing course as prescribed by GM-Corporate HSSE;**
C. Participation in at least five corporate SMS audit as a team member;
D. Feedback from the auditee;
E. Deemed to be competent to be a lead auditor by the ED -HSSE/ GM-HSSE.
F. Minimum work experience of 5 years

6. Audit Procedures

6.1. Annual CSMS Audit Plan

The **Annual CSMS Audit Plan** shall be prepared by Corporate- CSMS Audit Manager under approval from GM-HSSE/ED-HSSE and communicated to selected BU by **30 th April every year** to enable them prepare specific schedule. . The number of installations/locations may be selected based on the guidance provided in item 2.

Criteria for selection of representative location's may include:

A. The level of risk for the process/activity;
B. Any Major Incident;
C. The statutory, regulatory and contractual requirements.
D. The results of previous audits.
E. Advise of BU HSSE Role Holder

Corporate - CSMS Audit Manager shall prepare an annual CSMS Audit Plan. The plan shall include the following information:

- Name of BUs
- Location's to be audited

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- Month
- Duration
- Audit Criteria
- Name of Lead Auditor
- Audit Team Member(s)
- Auditee Representative
- Any other detail as needed

6.2. Audit Scope and Objective

These shall include the following:

- Evaluate whether Location's SMS conform to planned arrangements (BPCL Corporate Safety Management Systems and Technical Standards) and implemented effectively;
- All elements of the CSMS framework have been implemented;
- Strategic objectives are being achieved;
- Annual safety plans are being complied;
- Action items from previous audits have been closed-out.

Reporting the audit results to GM-HSSE, BU Head and BU HSSE Role Holder. The scope shall include BPCL Corporate Safety Management including policy,stretegic objectives, Life Saving Rules and CSMS Basic Minimum Requirements as per 8 Elements model

Elements	Sub- Elements
1. Leadership and Accountability	1.1 Visibility 1.2 Pro active in Target Setting 1.3 Informed Involvement
2. HSE Policy and Strategic Objectives	2.1 BPCL HSE Policy 2.2 Subordinate Policies/ Rules 2.3 Strategic Objectives 2.4 Dissemination
3. Organization, Resources, Training & Competence	3.1 Organization 3.2 Roles, Responsibilities & Accountabilities 3.3 Resources 3.4 Contractors 3.5 Training 3.6 Competence 3.7 Internal and External Communication

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4. Risk Assessment and Management	4.1 Risk Assessment and Management Framework 4.2 Hazard Identification 4.3 Risk Assessment 4.4 Risk Control
5. Planning, Standards, Procedures & Documents	5.1 Process Safety Information 5.2 Process Hazard Analysis 5.3 Design and Construction 5.4 Project Safety Management Plan 5.5 Operations Integrity 5.6 Periodic Inspection ,Calibration and Testing 6.7 Pre Start up Reviews 5.8 Management of Change 5.9 Control on Critical Drawings and Documents 5.10 Annual Safety Plan 5.11 Standards, Procedures, Work Permit System and work Instructions 5.12 Job Safety Plans 5.13 Emergency Response & Planning 5.14 Documentation 5.15 Fleet Safety
6. Implementation, Monitoring & Performance Reporting	6.1 Implementation 6.2 Non Compliance and Corrective Action 6.3 Compliance to Applicable Laws and OISD Codes 6.4 Behaviour Observation Program 6.5 Performance Monitoring 6.6 Incident Reporting, Investigation and follow up 6.7 Records
7. Safety Assurance	7.1 Audit Programme/Plan 7.2 Corporate Safety Management Audit 7.3 Auditors Competency
8. Management Review and Improvement	8.1 Review Process 8.2 Improvement

6.3. Composition of Audit Team

CSMS audit team shall comprise a lead auditor and minimum one/two auditors. The responsibility for successful completion of the audit shall rest with lead auditor. All auditor are obliged to

- be indepdent of the unit to be audited
- Exercise ethical practices , due professional care and logical judgements
- provide true and accurate information their investigation

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- Not issue inaccurate audit reports or conceal relevant information

6.4. Methodology for Execution of Audits

The lead auditor shall coordinate with unit to ensure that the audit is carried out on the due date. Audit methodology shall include interview, examination of documents/records and site assessment and judicious use of checklist. While auditing review of previous audit findings shall be done. **Refer Appendix 1 for key steps for audit methodology.**

The audit team will present the audit results to the auditee and their management at the conclusion of the audit. This closing meeting or presentation shall be conducted at the end of the audit or as pre-arranged between the Auditee and the Lead Auditor. The purpose of this meeting is to formally communicate the findings and the assessment of the acceptability of controls to the Auditee and the management team and to ensure clarity of understanding. The findings, associated classifications, and acceptability of controls shall be considered "frozen" and only editorial changes allowed may be considered. The lead auditor may also be asked by the auditee to present the audit results to wider audience.

6.5. Compliance Level Evaluation

To arrive at the Compliance Level and Scores for each of the CSMS Elements, the Table given below may be used. There are 4 distinct levels against each CSMS audit requirement. An audit checklist with corresponding compliance level and compliance score criteria is enclosed at **Appendix 2** and is recommended for use. To arrive at the appropriate compliance score against each requirement, auditors shall use the information / data as obtained from site visits, interviews and documentation reviews and exercise all possible due diligence and professional care in arriving a particular score.

Compliance Level & Score	Definition
Refer Appendix 2	**Lack of Process**- There is no evidence that the CSMS- Basic Minimum Requirement is recognized as part of Location's SMS.
	Process is maintained below standard- The CSMS- Basic Minimum Requirement is recognized as a Location's SMS, however is only partially being implemented/ complied with.

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	Process is maintained as per standard/requirement and effective : The CSMS- Basic Minimum Requirement is recognized as a Location's SMS and is fully implemented/ complied with and effective.
	Process is well maintained and sets an example f best practice: The CSMS- Basic Minimum Requirement is recognized as a Location's SMS, fully implemented/ complied with, effective and exceeding the expectations.

6.6. Location'/BU overall CSMS Compliance Evaluation and Performance Grading System

The status of design, implementation and effectiveness of CSMS at location level shall be assessed in the following 4 levels based on the overall sum of compliance score.

Performance Level	Overall Compliance Score (%)
Professional	**91 and above**
Skill	**81 to 90**
Basic	**70 to 80**
Unacceptable	**Less than 70**

Note : The status of design, implementation and effectiveness of CSMS at BU level shall be assessed on the basis of average of compliance score level as obtained by individual locations as per above grading system.

Audit Findings

Audit team shall develop audit findings and accordingly determine compliance score level and assign most appropriate value based on objective evidence as identified during the interviews, field visits and examination of documents and records etc. Every audit Finding should be based on demonstrable facts or evidence.

6.7. Prepare Audit Report

The Lead Auditor shall prepare the audit report from the audit team inputs. As a minimum the Audit report shall contain:

- Executive Summary
- Scope
- Objectives
- Terms of Reference

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- Overall CSMS Score and Performance Grading (Refer Appendix II)
- General Observations
- Recommendations for Improvement

Sl No	CSMS Element	Sub Element	Audit Findings	Colour Code *	Recommended Actions

* Colour Code Table

Colour Code	Priority Actions	Remark
Priority 1	**High**	To be implemented as priority one within 15 Days
Priority 2	**Medium**	To be implemented as priority one within 30 Days
	Not Applicable	Monitor and maintain existing arrangement

Audit team shall make efforts to record the actual facts during the audit and the same may or may not be agreed by the Auditee(s) ; however the observations and findings of the Audit team shall be final.

6.8. Distribute Audit Report

The Lead auditor shall submit the audit report to Corporate -CSMS Manager within 2 weeks from the conclusion of the audit. The Corporate-CSMS Audit Manager shall distribute report as determined by the ToR. As a minimum, the report Audits shall be distributed to

- ED-HSSE
- GM-HSSE
- BU-Head
- BU HSSE Representative
- Regional HSSE Committee Members

6.9. Conduct Audit Follow Up

The final closure statement of audit report with evidence of remedial actions shall be sent to Corporate -CSMS Manager within 4 weeks of the submission of the audit report . The evidences supporting the effective closure shall be retained until the next audit by the Location.

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7. Review

Corporate HSSE shall review this technical standard once in 2 years and need based in consultation with BU HSSE Role Holders.

8. Definitions

Item	Definition
ALARP (As Low As Reasonably Practicable)	Means to reduce a risk to a level that is as low as reasonably practicable and involves balancing reduction in risk against the time, trouble, difficulty and cost of achieving it.
Audit	An independent, systematic and documented process of objectively obtaining and evaluation verifiable evidence to determine that business controls: - are complete and consistent - are effective and efficient - safeguard the company's resources and promote their effective use - provide, and protect the integrity of, required records and information allow for compliance with policies, chosen standards, laws and regulations.
Company	BPCL or Contractor's organization as registered under Applicable law in India.
Competence	Ability to apply knowledge and skills to achieve intended results
Conformity	Fulfilment of a requirement
Corporate	Refers to BPCL Corporate
Consequence	A measure of the expected effects of an incident
Correction	Action to eliminate a detected nonconformity
Corrective action	Action to eliminate the cause of a nonconformity and to prevent recurrence
Continual improvement	Recurring activity to enhance performance
Safety Management	The part of the overall management system that includes organisational

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Item	Definition
Systems	structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the safety policy
Safety Objective	Overall goal, arising from the HSE policy, that a Location sets itself to achieve, and which is quantified where practicable
Safety Critical activities	Activities that have been identified by the Hazards and Risk Assessment Process as vital to ensure asset integrity, prevent incidents, and/or mitigate adverse safety consequence.
Safety Performance	Measurable results of the Location safety management system, related to an organisation's control of its OHS Risks, HSE Policy and Objectives.
Safety management system audit	Systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled.
Nonconformity	Non-fulfillment of a requirement. Requirement relates to applicable legal requirements and voluntary obligations to which the organization subscribes, including requirements in this Technical Standard
Performance	Measurable result
Performance indicator	Comparative, quantitative measures of actual events, against previously specified targets, which provide a qualitative indication of future projected performance based on current achievement.
Strategic Objectives	Goals which the organisation wishes to achieve over the long-term provides a basis for judging progress and achievements. Strategies provide the framework for plans to achieve the objectives used as a screen for possible plans. An objective can be strategic, tactical, or operational.
Terms of Reference	A letter to the Auditee confirming the understanding of the arrangements for the audit.

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9. Abbreviations

API	Audit Performance Indicators
ALARP	As Low As Reasonably Practicable
BPCL	Bharat Petroleum Corporation Limited
BU	Business Unit
BSMS	Business Safety Management System
CSMS	Corporate Safety Management System
ERDMP	Emergency Response and Disaster Management Plan
HSSE	Health, Safety, Security , Environment
HAZOP	Hazard and Operability Analysis
HIRA	Hazard Identification and Risk Assessment
IRCA	International Register of Certificated Auditors- U.K.
ISO	International Organization for Standardization
IS	Indian Standards
JSP	Job Safety Plan
MAH	Major Accident Hazard
NFPA	National Fire Prevention Association
LSMS	Location Safety Management System
OISD	Oil Industry Safety Directorate
RLTIFR	Reportable Lost Time Injury Frequency Rate
OHSA	Occupational Health and Safety
P &ID	Piping & Instrument Diagram
TS	Technical Standard
WPS	Work permit system

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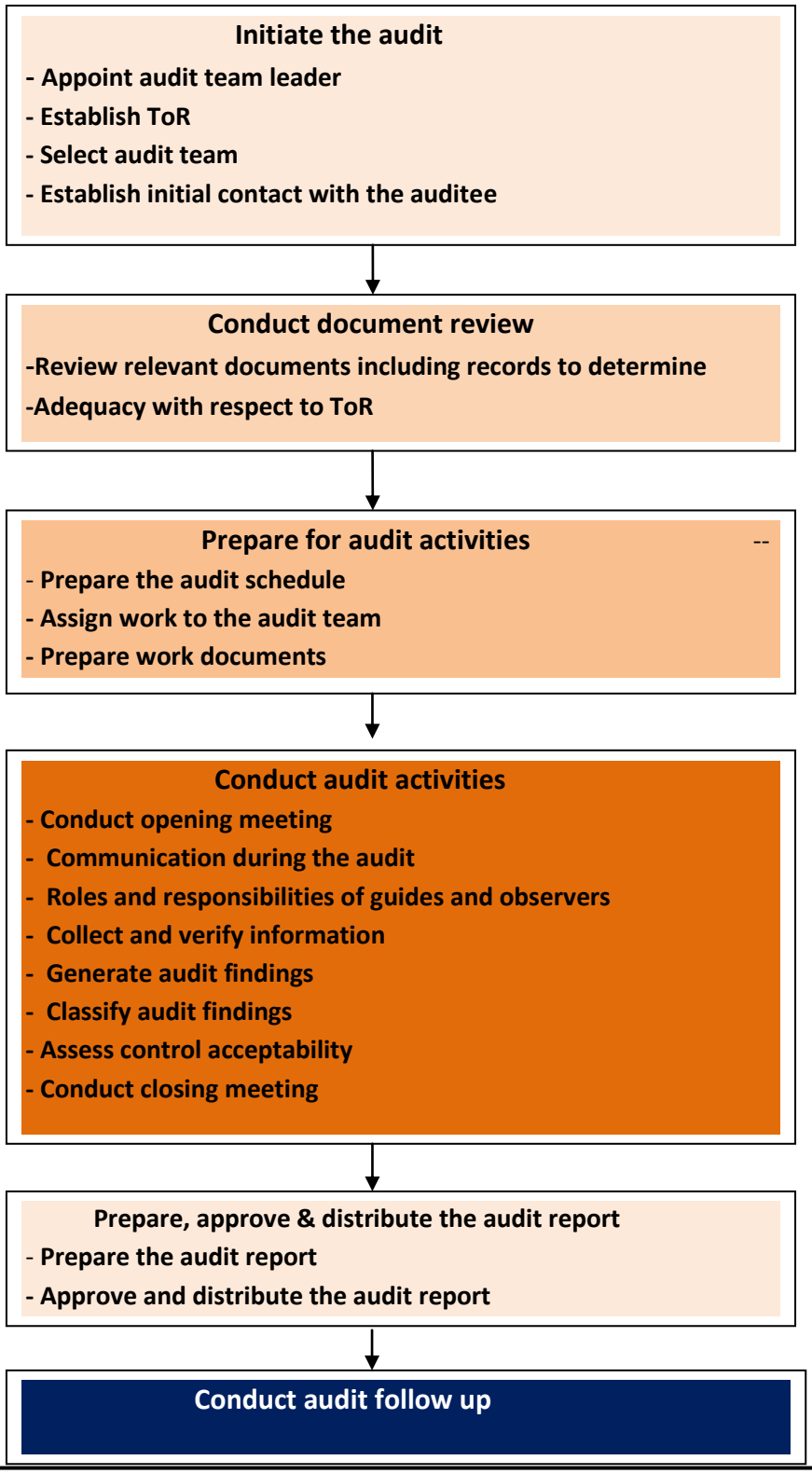
Appendix 1 : Audit Methodology



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Appendix 2 : Audit Compliance Evaluation Checklist

S.No	Audit Elements*	Audit Finding Verification Ref as applicable	Compliance Levels and Compliance Scores				
			Lack of Process	Maintained Below standard	Maintained per & standard Effective	Excellent & Best Practice	FINAL SCORE
API 1- CORPORATE SAFETY MANAGEMENT SYSTEMS			**0**	**1-5**	**6-10**	**11-15**	**705**
0.1	**BPCL Safety commitment and Core Principles**						
0.2	**Status of Implementation of BPCL 12 Life Saving Rules**						
1.LEADERSHIP & ACCOUNTABILITY							
1.1	**Visibility**						
1.2	Pro active in Target Setting						
1.3	Infirmed Involvement						
2. HSE POLICY & STRATEGIC OBJECTIVES							
2.1	BPCL Safety Policy						
2.2	Subordinate Policies						
2.4	Strategic Ojectives						
2.5	Dissemination						
3. ORGANIZATION, RESOURCES, TRAINING & COMPETENCE							
3.1	Organization						
3.2	Roles, Responsibilities & Accountabilities						
3.3	Resources						
3.4	Contractors						
3.5	Training						
3.6	Competence						
3.7	Internal and External Communication						
4. RISK EVALUATION AND MANAGEMENT							
4.1	Risk Assessment and Management Framework						
4.2	Hazard Identification						
4.3	Risk Assessment						
4.4	Risk Control						
5. PLANNING,STANDARDS,PROCEDURES AND DOCUMENTATION							

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5.1	Process Safety Information						
5.2	Process Hazard Analysis						
5.3	Design and Construction						
5.4	Project Safety Management Plan						
5.5	Operations Integrity						
5.6	Periodic Inspection ,Calibration and Testing						
5.7	Pre Start Up Safety Review						
5.8	Management of Change						
5.9	Control on Critical Drawings and Documents						
5.10	Annual Safety Plan						
5.11	Standards, Procedures, Work Permit System and Work Instructions						
5.12	Job Safety Plans						
5.13	Emergency Response & Planning						
5.14	Documentation						
5.15	Fleet Safety						
6. IMPLEMENTATION , MONITORING & REPORTING							
6.1	Implementation						
6.2	Non Compliance and Corrective Action						
6.3	Compliance to Applicable Laws and OISD Codes						
6.4	Behaviour Observation Program						
6.5	Performance Monitoring						
6.6	Incident Reporting, Investigation and follow up						
6.7	Records						
7. SAFETY ASSURANCE							
7.1	Inspection Program						
7.2	Safety Management Audit						
7.3	Auditors Competency						
8.MANAGEMENT REVIEW							
8.1	Review Process						
8.2	Improvement						

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API 2- SAFETY PERFORMANCE INDICATORS			**SPI are partly maintained and / or deficient**	**SPIs are fully maintained and analyzed**	**SPIs are fully maintained & analyzed , Reviwed and acted upon**	**Excellent & Best Practice**	**FINAL SCORE**
			-50 to 10	**50 to 100**	**100-200**	**250**	**500**
9.1	Depolyment,Measurement and Review Status of Leading Safety Performance Indicators						
9.2	Depolyment,Measurement and Review Status of Lagging Safety Performance Indicators						
API 3- PROCESS SAFETY EVENTS MANAGEMENT			**PSE are partly maintained and / or deficient**	**SPIs are fully maintained and analyzed**	**SPIs are fully maintained & analyzed , Reviwed and acted upon**	**Excellent & Best Practice**	**FINAL SCORE**
			-100 to 20	**100 to 200**	**200-400**	**500**	**500**
10.1	Depolyment,Measurement and Review Status of Process Safety Events						

***Note :**

1. Corporate SMS Audit Manager and Lead Auditors shall develop and periodically review the indicative checklists for each audit element based on the focus and need of the organization.

2. Corporate SMS Audit Manager in consultation with GM- HSSE/ ED HSSE may modify the scoring system based on the experience gained and as relevant.

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Sl. No.	Elements
ELEMENT 1- LEADERSHIP & ACCOUNTABILITY	
1.	Whether location demonstrate strong, pro-active and visible leadership in safety by developing relevant.
	A. Organizational strategies?
	B. Management initiatives?
	C. Personal behaviours?
2.	Has location established and maintained a structured documented management systems consisting of safety policies, objectives, safety plans, standards and procedures?
3.	Have these been communicated effectively?
4.	Has location actively implemented systems to ensure competence of employees and contractors through training and motivation?
5.	Is safety performance integrated in employee & contractors performance appraisals?
6.	Does location conduct periodic management reviews at appropriate intervals?
ELEMENT 2- HSE POLICY & STRATEGIC OBJECTIVES	
7.	Is a written HSE policy consistent with corporate and business policies available and deployed?
8.	Are subordinate policies available for relevant safety subjects (Drugs and Alcohol, No Smoking Safety, etc)
9.	Are SMART strategic safety objectives developed consistent to the HSE policy and with risks and stakeholders expectations?
10.	Is progress towards safety objectives monitored by top management?
ELEMENT 3-ORGANISATION,TRAINING, RESOURCES AND COMPETENCE	
11.	Is an appropriate location HSSE organization and HSSE committee structure with description of responsibilities established?
12.	Are the key safety responsibilities of top management, managers, line supervisors, employees and contractors' staff, described and documented?
13.	Is responsibility for plant/facility technical integrity management defined and documented?
14.	Are resources including human, technical and financial for effective implementation of safety management provided and visible?
15.	Are employees held accountable for their own performance and the performance of their direct report at every level by implementing consequence management policies?
16.	Are training procedures established and maintained covering all levels of the location?

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17.	Is the competency of employees in safety matters assured and documented? a. Work at height, b. Electrical work, c. Work Permits d. Gas testers, e. Fire fighting teams, f. Personnel involved in hazardous chemicals handling, g. Emergency response, h. Assurance and auditing etc
18.	Are contractor's safety management process and procedures established and applied effectively?
19.	Are procedures & mechanisms for internal & external safety communication defined and implemented?
ELEMENT 4 RISK ASSESSMENT AND MANAGEMENT	
20.	Is a procedure for risk evaluation and management covering all activities; a. Project planning, b. Engineering, c. Operation d. Maintenance and e. Decommissioning using established hazard identification & risk assessment methodologies developed and implemented?
21.	Is training on risk evaluation & management conducted and a certified cadre of professionals maintained?
22.	Are adequate risks registers maintained, approved by senior management and kept updated?
23.	Are hazards identified comprehensively and risk assessment methodologies suitably applied?
24.	Is an appropriate process safety program developed, where storage and handling of hazardous chemicals are involved and may results in serious accidents in case of unplanned release of hazardous chemicals?
25.	Are MSDS of chemicals being handled and used available and displayed near point of use?
26	Are process safety management elements effectively implemented?
27.	Are records of process safety risk evaluations (HAZID, HAZOP, QRA, etc.) available and findings suitably closed?
ELEMENT 5- PLANNING, STANDARDS , PROCEDURES AND DOCUMENTS	

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28.	Is an annual safety plan to meet the site strategic safety objectives and ongoing activities developed and endorsed by the site safety committee?
29.	Does the annual safety plan includes; f. Ongoing activities to achieve zero harm g. Strategic Objectives h. Result of hazard identification and risk assessment i. Legal and other requirement j. Result of assurance and audits k. Learning from incident investigation l. Resources needed to achieve goal of zero harm m. Opportunities from new or different technology options n. KPIs including Dashboard - Current and desirable state
30.	Are suitable design, construction, operation and maintenance standards on facility management identified and available with relevant functions?
31.	Are construction safety plan(s) developed and implemented to ensure safety during construction?
32.	Is safety critical equipment listed and adequate asset integrity controls identified/applied?
33.	Are systems and procedures for maintaining technical integrity with respect to; o. Mechanical, p. Electrical, q. Instrumentation r. Civil s. Structural, t. Process and chemical, u. Fire & gas protection etc. established and implemented?
34.	Are safety standards and operational control procedures and basic safety rules based on results of risk assessments established and implemented?
35.	Is a work permit system for control of non- routine hazardous activities established and maintained and documented?
36.	Is work permit system administration system defined, responsible persons trained and held responsible for their actions?

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37.	Are procedures for the control of safety documentation defined with respect to; v. Identification, w. Change, x. Storage y. Retention and z. Disposition, and are practiced.
38.	Are management of change / pre-start up safety reviews procedures and processes established with designated functions to evaluate and control changes that may affect compromise operational integrity?
39.	Are records of management of change and pre start up safety reviews available?
40.	Are emergency response plans and procedures define foreseeable potential emergency situations from; aa. Upset in operations bb. Uncontrolled release of contained energy cc. Other man-made scenario dd. Natural event and also addresses; a. Organization structure b. Defined roles and responsibility to mitigate and manage defined scenario and implemented?
ELEMENT 6-IMPLEMENTATION, MONITORING & PERFORMANCE REPORTING	
41.	Have safety critical activities been defined implemented?
42.	Are standards, procedures and work instructions available for all safety critical activities and implemented?
43.	Are Job Safety Plan, Safety Observation and other suitable programs established and maintained to demonstrate safety as line function responsibility?
44.	Are procedures for defining responsibility and authority for handling and investigating of non-compliance with safety legislation, regulations, policies, standards and procedures established
45.	Are procedures for records management and control established for the identification, maintenance and disposition of documentation?
46.	Does management regularly measure, record, review, analyze and report key safety performance indicators (KPIs) as established by Corporate, Business Unit or respective location?

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47.	Does management reports the performance of their KPI's in at appropriate frequency ?
48.	Are procedures established and maintained for the identification, reporting (internal and external), investigation of incidents and actions to prevent reoccurrence?
ELEMENT 7-SAFETY ASSURANCE	
49.	A suitable compliance assurance/audit programme developed and effectively implemented to review and verify effectiveness of the safety management system. It shall at least include: • Internal Audits by the Location/ BU • External audit by OISD and other third party audits • External Certification Audits • Corporate Safety Management System Audit • Process Safety Audits • Special audits such as electrical safety, IS 14489 audits etc
ELEMENT 8-MANAGEMENT REVIEW AND IMPROVEMENT	
50.	Does management regularly review the suitability, adequacy and effectiveness of the safety management system to drive continual improvement in safety performance in accordance to Statement of Commitment , HSSE policy and core principles?

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Refinery Operating System

ROS-014

Edition: 2015, Revision: 00/2015

HEALTH, SAFETY, SECURITY AND ENVIRONMENT COMMITTEES

Bharat Petroleum

Kochi Refinery

This ROS outlines requirements of various HSSE committees in BPCL Kochi Refinery for effective HSSE management and to ensure employee participation and consultation with all stake holders in HSSE activities.

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Reviewed by

HOD – Fire & Safety

Functional Head - Operations

Functional Head - Technical

Functional Head- HR

Submitted for Approval

Functional Head in charge of ROS Revision

Approved in : **Refinery Council**

RC Meeting Record Note : 98 dated 29-08-2014.

Approved By

Head of Kochi Refinery

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AMENDMENT SHEET

All amendments in this ROS shall be document in the following table. The details of the amendment shall be elaborated in a separate document (Amendment Document) and shall be available with custodian.

Tracking ID	Section No	Amendment		Reason	Amendment Document No
		From	To		
ROS-014/15-01	All			Revised in Total	ROS014/AD-01

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PREFACE

Director (Refinery) of erstwhile Cochin Refineries Limited (CRL) appointed a committee in 1994 for devising a procedure of standard operations. The committee formulated a system named Refinery Operating System (ROS). A set of ROS was formulated and released by the committee. Over years, the ROS was evolved to a well-documented Refinery Operating System (ROS), which outlines the Management System Procedure for various business processes in the refinery. There were 90 approved ROS and 12 ROS under formulation before the current edition. Prior to 2014 edition, Project (Technical) department, which was earlier known as Corporate Planning, before organizational re-structuring in 2006, was the custodian of the ROS.

In 2014, General Manager (Operations) constituted a task force for a thorough revision of ROS in terms of the purpose, relevance, scope and work flow in the current business context vide office note KDD/03/09 dated 28-02-2014.

The task force reviewed entire ROS and concluded that entire structure and contents required a major revision. In order to incorporate standardization, the task force decided to formulate the first ROS, which outlines procedure for formulating a ROS. Hence the first ROS in the series was revised in full incorporating document structure, numbering philosophy and new approval procedure.

Scope of the previous version of ROS 10 "Safety Committees and Safety Audits" Rev06 of year 2008 included both safety committees and safety audits. In recent years, new HSSE committees and audits in the refinery were added and were not covered in the previous ROS. In order to manage the activities related to committees and safety audits/inspections, task force decided to formulate two separate ROS by splitting ROS 10; one for the HSSE Committees and the other for HSE Audits and Inspections.

The committee provided new number for this ROS as ROS-014 as per the numbering philosophy adopted in ROS-001. The ROS-014 deals with various HSSE committees, their functions, authority of the HSSE committees, members of a committee and their selection, frequency of meetings etc.

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Task Force for ROS Edition-2015

The Task Force was constituted by Mr. Soman C. K., General Manager (Operations) in 2014 for revision of the existing Refinery Operating System.

Task Force was functioning under the leadership of Mr. Neelakanton M.N., General Manager (Advisory Engineering).

Task Force

Sl. No.	Name	Designation
1.	Muralidharan V.	Deputy Manager (E & C)
2.	Naizu A. V.	Manager (F & S)
3.	Roopesh M.	Manager (Inspection)
4.	Saji Babu	Manager (Manufacturing)

In addition to the above, several experts from various departments contributed in the preparation, review and finalisation of this document.

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