HINDALCO

PROJECT SAFETY MANAGEMENT STANDARD

HINDALCO INDUSTRIES LIMITED

TABLE OF CONTENTS

4.0	Annexures		
	Annexure-A	Pre-Qualification Criteria Checklist	
	Annexure-B	HIL HIRA FORMAT_RISK MATRIX	
	Annexure-C	Procedure for hiring Mobile Material Lifting Machines	
	Annexure-D	Specifications - Hiring of Rescue Agency	
	Annexure-E	General Health & Safety Guidelines for Contractors	
5.0	ATTACHMENTS		
	Attachment 1	General Work & Equipment Clearance Work Permit From HIL-PWF-1	
	Attachment 2	Hot Work Permit HIL-PWF-2	
	Attachment 3	Work at Height Permit HIL-PWF-3	
	Attachment 4	Excavation Permit HIL-PWF-4	
	Attachment 5	Electrical Work Permit HIL-PWF-5	
	Attachment 6	Confined Space Entry HIL-PWF-6	
	Attachment 7	Hazchem pipeline breaking and equipment opening HIL-PWF-7	
	Attachment 8	Heavy and Asymmetric Material/Load Lift HIL-PWF-8	
	Attachment 9	Monitoring, Auditing and Review of the Permit Work System	

1.0	**Introduction:**
	Hindalco's commitment to Health and Safety of our employees, associates and all stakeholders is more than just a series of policies and programs. The commitment lives at the core of our culture and guide every decision that we make. Project construction worker safety and health continues to be an important concern for Hindalco since construction industry has consistently experienced higher injury and illness rates compared to manufacturing and mining. Improvement in project safety management practices is needed to lower the level of risk and improve worker safety and health performance. There is a great deal of knowledge of specific successful management practices with Hindalco, from past project experiences, which can be used to enhance construction safety and health performance of the projects. Hindalco wants to practice these successful management practices or strategies to prevent injuries, illnesses, and fatalities at their ongoing project sites. These are often "above and beyond" regulatory compliance. Instead of re-inventing the wheel, contractors, who are interested in improving their safety performance, can implement proven best practices narrated in this during different project phases (e.g. Design or Construction) within their projects, thereby improving their project safety and health performance. Hindalco shall provide all kind of help in this endeavour.
1.1	**Purpose**
	The purpose of the Project Safety Management standard is to provide comprehensive coverage of best practices for all phases of a construction project from project planning, design, project start-up, construction, commissioning, and closeout. The standard's scope is limited to safety management, administration, and programs in construction.
1.2	**Scope**
	The standard spells out safety expectations from Hindalco Project management team, contractors & subcontractors including all tiers of contractors as requirements stipulated are applicable to all phases of project implementation till commissioning of plant / facilities and completely handing it over to operation team
1.3	**Regulatory Reference**
	All regulatory requirements referenced in this are based on Building and other Construction Workers (BOCW) act for green field projects and The Factories Act for brown field projects. However, the contains several safety management best practices learned during due course from various contractors which often go beyond the regulatory requirements. Entire Hindalco project team and all contractors shall note it. It may also be noted that the materials available in this are intended to provide general information about the subject matter covered. They are not meant to provide legal advice.

1.4	**References**	
	a. Building and other Construction Workers (BOCW) Act b. The Factories Act and Rules framed there under c. Hindalco Permit to Work and Permit formats d. Hindalco Incident and Accident Investigation e. Hindalco Electrical Safety f. Hindalco Hot Work Safety g. Hindalco Fire Safety h. Hindalco Road and Vehicular Safety and guideline made there under I. Passenger vehicle safety guideline II. Mobile cranes and & specialised equipment and vehicle hiring rules. i. Hindalco Hazard Identification & Risk Assessment (HIRA)	
1.5	**Definitions, meanings and abbreviations**	
	Work Group	
	Permit Applicant (PA)	The official, either from Hindalco or Contractors, who applies for permission to conduct job in prescribed format to Area Owner (AO). He will also act or nominate a Permit Holder when the work is under way.
	Area Owner (AO)	The shift in-charge or a designate or package owner with responsibility for an area or project package. He is directly responsible for the control of work in that area. He is the person responsible for the Endorse or Validate and Re-validate the permits each shift, and finally for Cancelling Permits.
	Approving Authority (AA)	The Hindalco official who has overall responsibility for the project or area or his/her designate who is authorized to approve the permit and to agree the work description, validity period for the permit, preparations and review / initiate / add precautions.
	Accident	An event or incident with injury.
	Incident	An event without an injury
	Near Miss	An incident which may cause accident of any severity
	Reportable Accident	
	Restricted Work Case	The person is temporarily assigned to another job, usually of a less demanding physical nature, until recovery allows them to return to his/her normal work.

	First Aid Case	First Case includes managing and caring for a patient for the purpose of combating disease or disorder. It normally involves just one visit to industrial health physician.
	Medical Treatment case	Medical treatment includes managing and caring for a patient for the purpose of combating disease or disorder. It normally involves more than one visit to industrial health physician.
	Recordable Injuries	
	Loss Time Injury	The injured person is absent from work for one or more scheduled workdays after the day of the accident
	Loss Time Injury Frequency Rate (LTIFR)	(Total No of Reportable Injuries x 1000000) / Total Man hours Worked
	Loss Time Injury Severity Rate (LTISR)	(Total No of Manday lost x 1000000)/ Total Man hour Worked
	Recordable Injury Frequency Rate (TRIFR)	(Total No of Recordable Injuries x 1000000)/ Total Man hours Worked

2	**Procedure for implementation of requirements of the**
2.1	**General Safety Rules for the Hindalco Project Sites**

	• **See and Be Seen:**
	  ○ All the persons entering inside the project site shall be wearing high visibility vest, Safety shoes with fluorescent strips, safety helmet with visible strips pasted on it. In case of special uniform to be worn by certain trades like electrician's wear arc flash suits, both trousers / shirts shall have minimum two strips all around stitched.
	  ○ All the passenger vehicles (Motor Bike / four-wheeler) shall have Day Running Light (DRL) on. Visibility of motor bike and four-wheeler shall be increased / reinforced by additional fluorescent strips pasted in addition to fluorescent lights / feature legally required.
	  ○ For earthmovers, excavators, cranes where counterweight / back portion of the vehicle swings, edges of the counterweight / back portion of the vehicle shall be pasted with fluorescent strips.
	  ○ Illumination in the work area shall be adequate

	• All the incidents / accidents must be captured and reported to Hindalco site management as soon as possible, but not later than four hours after the incident / accident
	• All the incidents / accidents must be investigated using structured techniques like Failure Mode Effect Analysis (FMEA) or Why-Why analysis etc. Category 5 & 4 accident or near miss having potential for category 5 & 4 injury accident shall be investigated by "TapRoot". Hindalco
	• All vehicles, commercials or passenger, shall ply at speed not more than 20 Km / Hour
	• All passenger vehicles shall have three-point retractable seat belt for each seat.
	• Age of heavy equipment, machinery or commercial vehicles brought at project site shall not be more than 10 years.
	• Operation and Maintenance Manual of heavy equipment, machinery or commercial vehicle brought at project site shall be available with that equipment, machinery or vehicles. All the inspections, checks and maintenance mandated by operation and maintenance manual shall be adhered with.
	• Age of passenger vehicles brought at project site shall not be more than 5 years.
	• Thorough hazard identification, risk assessment and identification of controls followed by permit to work is necessary to carry out any work at Hindalco project site.

	Vehicles and Pedestrian Entry and exit points • Separate entry and exit points should be established for heavy machinery/vehicle access, to strengthen pedestrian safety at high traffic points.
	• Environmental conditions or Extreme weather conditions can cause serious safety hazards. On-site emergency plan should provide clear guidelines for workers who need to stop work in the event of natural disaster, severe environmental conditions or other emergency circumstances.
	• **Conduct daily site inspections and safety meetings** Jobsites should be inspected before and after each workday to address any safety concerns such as tools left lying around or damaged equipment. Jobsites should also be inspected throughout the day to identify any potential hazards and monitor workers to make sure they are working safely. • Hold a brief safety meeting before work begins each day to go over what tasks are scheduled to be performed along with the safety procedures to be followed. Be sure to address any concerns or issues and acknowledge the good practices observed from the prior day.
2.2	**SELECTION OF CONTRACTORS** Contractors in this chapter refer to general contractors, subcontractors, and sub-tier contractors.
	Prequalification based on safety background.
	The selection of contractors should be based on past safety performance. This is to be done using a well-established safety management best practice called contractor safety pre-qualification.
	To assess the past safety performance of the contractors and rate them on safety front, the questionnaire provided in Annexure II of Hindalco Contractor Safety Procedure shall be used. Attached as **Annexure-A:** Pre-Qualification Criteria Checklist
	For application of this annexure, if the cost of contract is more than 20 Crores, then contractor shall be considered as major or else minor. The primary rationale behind this practice is to establish and use a pre-qualification process to select contractors who are likely to complete a construction project safely.
	For the pre-qualification process, Hindalco is required to obtain the safety performance information from contractors with the help of a form typically called “Pre-qualification Safety Questionnaire”, with predefined marks for each field. It is very simple and straightforward to fill.
	To avoid any errors, omission, or misrepresentation about safety performance metrics, it is always better to verify the information provided by the contractors by requiring them to submit support documentation. Typically, the following documentation, for each of the last three calendar years, is requested from the contractors as part of the pre-qualification process.

	The process is designed to quantify and hence Hindalco shall get marks scored by each contractor at the end of this exercise. If a contractor scores more than 85% marks in this exercise, shall be considered acceptable by default. The contractor scoring marks less than 85% but more than 60% will be considered acceptable with rider that they shall improve their score within three months. The contractors scoring less than 60% will be considered non-acceptable.
	The assessment of the contractors based on the safety metrics is the most critical step in the selection process because it is identifying a safe contractor, whom it will allow to bid or perform work on Hindalco projects. Panelled Contractors List shall be prepared post this exercise.
	Enquiry shall be floated to contractors from Panelled contractors list.
	Setting up Hindalco's Safety Expectation
	Job specification(s) shall include entire safety expectations of Hindalco for the job it is employing contractor. It is to ensure Hindalco to clearly communicate their safety expectations for the project, so that contractors can allocate resources appropriate to the expectations of Hindalco and properly arrive at the cost.
	Pre-bid meeting There remains small but finite possibility that management of contractor has not completely / explicitly understood the safety expectation of Hindalco after going through "Job Specification". Thus, pre-bid meeting is essential to ensure that contractor has understood the safety expectations of Hindalco in totality, before quoting for the project / job.
	As a minimum, following officials shall be available for pre-bid meeting. From Hindalco side • Representative of commercial / contracting department • Representative of MCoE • Representative from site project management • Safety representative from corporate and/or project site From Contractor's side • Proprietor or his authorised representative capable taking financial decisions • Safety Professional who can understand safety requirements, their commercial implications and can explain it to proprietor or authorised representative.
2.3	**On-boarding of contractor**
	Following shall be ensured during the contractor's manpower, gadget, equipment and machinery mobilisation at Hindalco project team at site.
2.3.1	**Checking, Inspection and testing of the contractor's gadgets and equipment:**

	• The contractor is expected to submit list of all the gadgets, equipment, tools, tackles, machines and vehicles at the Hindalco Project site. • Fulfill the requirement mentioned in Health and Safety guidelines for Contractors (Annexure-E) • Hindalco Subject Matter Experts (SMEs) shall inspect / check all the gadgets / equipment at site entrance itself. Example: Electrical SME shall check electrical gadgets for electrical fitness, internal material handling SME shall check cranes, lifting tools and tackles etc. • SMEs shall also ensure that gadgets/equipment brought by contractor are complying with applicable legal requirements of the state. Example: Certificate issued for the fitness/healthiness of lifting slings by competent persons recognized by factories inspectorate of the state • Colour coded Label as per colour of the quarter of inspection shall be pasted along with test/inspection finding once testing/inspection is done.
2.3.2	**Manpower & Legal Compliance verification / Gate Pass preparation**
	1. Legal compliance related with labour laws by HR. Collection of essential documents etc.
	2. Documentation for creating entry passes
	3. Checking medical and physical fitness of the contractor manpower: All persons brought by the contractor must undertake medical and physical fitness tests commensurate with the job they are going to do. Example crane driver/operation shall have to undergo colour blindness test and welder/fitter/cutter etc. shall have to undergo acrophobia/height phobia tests.
	4. All workmen of contractor's must be able to read and understand safety warnings and signages clearly. This must be ensured as minimum qualifying criteria for hiring any workmen. Hiring of workmen for jobs which requires specific skills for example welding, electrical works, rigging, driving LMVs or HMVs, Operating cranes / MEWPs etc. must have valid applicable statutory license, certificates and passes as per HIL site safety management guidelines.
2.3.3	**Temporary Office setup and portable cabins**
	Temporary office set-up: The absence of proper facilities on a project site can lead to a domino effect of problems. Workers face discomfort and inconvenience, impacting morale and productivity. Delays can occur due to logistical issues like finding restrooms or designated eating areas. Safety hazards may arise if proper storage for tools and equipment is lacking. However, a well-equipped temporary office created at project office or portable cabin acts as a set up. It transforms a construction site into a functional and organized workspace. By providing essential features, temporary offices or portable cabins contribute significantly to: • Improved worker comfort and satisfaction • Enhanced productivity and efficiency

- Increased safety and security
- Streamlined operations and logistics

Portable cabins, also known as porta-cabins, are temporary structures that serve a multitude of purposes on construction sites. They provide essential facilities for workers, from basic amenities like restrooms and break rooms to dedicated office spaces and storage areas.

Checklist for ensuring safety at temporary office set up or porta-cabin.

SN		Yes	No	NA	Remarks	
A	**Electrical**					
1	Power supply to Porta-Cabin shall be provided through main distribution board rigidly fixed and equipped with isolation switch, miniature circuit breaker (MCB) and Residual circuit device (RCD / RCCB / ELCB) rated for 30 mA fault current.					
2	Each porta-cabin shall be earthed by two independent earth circuits leading two independent earth pits.					
3	Each temporary office structure shall be earthed as many as required depending on size but not less than two independent earth circuits leading two independent earth pits.					
4	Electrical Circuits are clearly identified electrical equipment used are rated for indoor as well as outdoor use.					
5	All permanent wires shall be rated for minimum 415 V / 25 Amp rating					
6	Flexible cords are not used as permanent wiring except for individual al appliances like PC, AC etc.					
7	Flexible cords are maintained in good condition without splices, deterioration or damage					
8	Three phase / high amperage electrical appliances like refrigerator, water heater, oven etc. shall be provided with independent circuits with switch and independent RCD rated for 30 mA fault current					
9	Access to electrical switches and circuit brakers is clear and not obstructed					
10	All the wiring is reaching completely into the electrical panel / JB and terminated through gland or properly secured					

	11	Flexible wires / cords are safely routed so as not create tripping hazard					
	12	Power switch outside porta-cabin to ensure no power is on when it is not manned					
	B	**Fire Prevention and Fighting Arrangement**					
	1	All fire extinguishers used (except for protecting computers, electronics/electrical gadgets and equipment) are stored pressure multipurpose type i.e. suitable to extinguish all types of fires.					
	2	At least one fire extinguisher is deployed per 100 Sq. meter area					
	3	Fire Extinguishers are inspected once a month by competent person					
	4	Smoke detector(s) are installed and are in working condition					
	5	Smoke detectors are inspected once a month by competent person					
	6	Fire & Safety equipment in temporary office / porta-cabin are unobstructed and visible					
	7	Interior (walls, floor and ceiling) is made of non-combustible material					
	8	Porta-cabin is provided with two escape doors and temporary office with two distinct escape routes with exists					
	9	Occupants are trained on use of fire extinguishers and escape routes					
	10	Fire mock drills are conducted at least once for temporary office.					
	C	**Miscellaneous**					
	1	Are rodent and paste control devices placed and in perfect working condition					
	2	Wild vegetation around temporary office / porta-cabin(s) are removed at least up to distance of 10 meters					
	3	Housekeeping around is neat and clean and dry & wet store & disposable arrangement					
	4	No gas cylinder (except one meant for kitchen) / paint drums is stored inside temporary office or porta-cabin					
	5	Warning signs and safety posters appropriate to sites are displayed					

		6	Self-charging, automatic, emergency electrical lamps, adequate in numbers					

2.3.4	**Electric Power Supply and Distribution**
	Distribution boards are an essential component of an electrical power supply system. A distribution switchboard is the point at which an incoming-power supply divides into separate circuits, each of which is controlled and protected by the fuses or switchgear of the switchboard. A distribution switchboard is divided into several functional units, each comprising all the electrical and mechanical elements that contribute to the fulfilment of a given function. It represents a key link in the dependability chain. Consequently, the type of distribution switchboard must be perfectly adapted to its application. Its design and construction must comply with applicable s and working practices.
	The distribution switchboard enclosure provides dual protection: • Protection of switchgear, indicating instruments, relays, fuse gear, etc. against mechanical impacts, vibrations and other external influences likely to interfere with operational integrity (EMI, dust, moisture, vermin, etc.) • The protection of human life against the possibility of direct and indirect electric shock
	As a minimum each distribution switch board shall be equipped with main switch to completely turn off power to downstream in case of emergency, Miniature Circuit Breaker MCB) for automatic tripping of power in case of fault and RCD / RCCB in each circuit separately to which switch board is supplying power to prevent human electrocution. Each distribution board shall be • All the switch boards shall be numbered and designated • On proper stand • Shall have canopy if in open • Protected from weather around (at least IP 57 grade) • Shall be earthed by two separate / independent earth circuits • Shall have visible indication that power is on • welding machine socket(s) (if it is meant to supply power to welding machine) with “On / Off” MCB switch and flip cover • Scull & Bone pictogram of appropriate size pasted on it • Area around electrical distribution board up to at least 5 meters shall be clear off any combustible material and wild vegetation • All switch boards shall be kept unobstructed
2.3.5	**Induction and Job Specific training to Contractor workforce by using Safety Park** • All Green field projects, high value projects or projects having construction period more than one year must ensure to keep budget for creating safety Park for training. The safety Park must be built on priority such that

	construction workers can be trained onsite. Post completion of project this facility will be handed over to operations team for their training. • **Induction and site-specific training by Hindalco safety professional at site:** Entire manpower brought by contractor shall undergo site specific induction training. In this training, safety professional shall explain about site specific safety rules, housekeeping, facilities available at site, laying of electrical cable and connections, PPE donning, Permit to Work (PTW), incident reporting procedures etc.
2.3.6	**Kick-Off Meeting with all contractor's senior management** Kick-off meeting should cover at least following: • Formal welcome • Re-emphasis of safety expectations of Hindalco • To know whose who • Establishing channels of communication / identification counterparts Provide system access / Wi-Fi / phones etc.
2.3.7	**Adherence to Contractor safety Management**
	Job / Role specific safety training by Field Contract Administrator (FCA) or representative of package owner(s)
	Make the contract management team aware of HIL CSM and relevant check sheets for contractor's performance assessment.
	Training Plan for all Contractors' site incharges, safety officers etc. for all Corporate Safety s and compliances.
2.4	**Monitoring Project Work for Safety**
2.4.1	**Permit To Work System & LOTOTO**
	For any job to be carried out at Hindalco project site, officials of contractors will have to obtain written permission in prescribed format (hereafter it will be called as permit to work).
	If the job does not involve high risk activity in it, then job can be done using "General work, Equipment / Area Clearance permit". This permit is two tier permits and involves only permit applicant (PA) and Area or Package Owner from Hindalco.
	If the job involves one or more high risk activity(ies) in it, then job can be done using respective high-risk permit along with "General work, Equipment / Area Clearance permit". The high-risk permits are three tier permits and involves in addition to Permit Applicant (PA) and Area or Package Owner, Approving Authority also from Hindalco.
	List of "High Risk Activity"

1. Hot work (work involving open flame / fire / spark etc.)
2. Work at height more than 2 meters
3. Excavation of earth
4. Confined space / vessel / equipment entry
5. Electrical work involving voltage more than 215 Volts
6. Lifting the load more than 2 tones by lifting tools and machines like cranes
7. Equipment / pipeline opening or breaking

Below is Authorizing Signatories Levels for PTW

Type of Permit to Work	WG	PA	AO	AA	Head Project
General Work Permit (Cold Work)	✓	✓	✓		
Hot Work Permit	✓	✓	✓	✓	
Work at Height Permit	✓	✓	✓	✓	At Night
Excavation Permit	✓	✓	✓	✓	At Night
Electrical Work Permit	✓	✓	✓	✓	
Hazardous Chemical Pipeline Breaking / Equipment Opening Work Permit	✓	✓	✓	✓	
Confined Space / Vessel Entry Permit	✓	✓	✓	✓	At Night
Lifting of Heavy Load (more than 5T)	✓	✓	✓	✓	At Night

All permits are normally issued with validity from 8AM to 6PM with extension up to 10PM in some special circumstances is possible.

Hazard identification and risk assessment using structured technique of Job Safety Analysis (JSA) is required to be completed and attached while requesting permit to carry out the job.

The JSA / Risk Assessment exercise shall be done using Hindalco prescribed format for the same. Hindalco uses following 5 X 5 matrix for risk assessment and same shall be used to arrive at risk

Permit is required to be displayed at workplace (PTW Not Displayed prominently will be considered as PTW not taken)

A job having more than one high risk activities, permits appropriate to those activities shall be required to be obtained. Example welding work at height: Permit for work at height as well as for hot work shall have to be obtained

Permit applicant shall at a time apply for permits not more than five jobs

All energy sources shall be isolated and energy level shall be brought to zero level and locked out and then tagged. Try out shall be carried out by PA post lock out and tag out.

Following color coded locks shall be used

1. Operation / lock out controller – Green Lock

	2. Mechanical Maintenance – Red Lock 3. Electrical Maintenance – Blue Lock 4. Instrument & Control – Yellow Lock
	Permit Closure must post completion of the job within 2 hours. After completion of work Permit issuer shall physically check and ensure that the following are cleared before closing of PTW: Grounds, Tools, Spares, Personnel, Debris, Scrap, fire hazards like red hot splatters on combustible materials etc.
	The PA is normally a Hindalco official however in some specific circumstances contractor's officials also can be given authority to work as permit applicant if he or she possess following • Degree in engineering or Diploma in engineering or science graduate • 2 years of working experience for engineering graduate and five years of working experience for Diploma engineer or Science Graduate • He / She has undergone a day long training on Hindalco permit system and understood it. • Post training his / her written competency test is carried out and he / she has scored more than 85% marks in test and cleared the oral interview simultaneously conducted by below defined respective Area Owner (AO), Approving Authority and Hindalco Safety professional.
2.4.2	**Hazard Identification, Risk Assessment (HIRA) & Establishing Control**
	It is the pre-requirement for obtaining the PTW
	It is the responsibility of Permit Applicant (PA). It must be carried out with the help of and involving work group (WG) after visit to workplace by PA.
	Hazard identification shall be carried out using structure technique called as **"Job Safety Analysis (JSA)"** to identify hazard(s) associated with each step / activity involved in the job. While doing this exercise both job specific hazards and hazards due to interaction with other job(s) or environment/situation shall be taken into consideration.
	Once the hazards are identified using JSA, risk assessment using Hindalco Risk Matrix (**Annexure-B:** HIL HIRA FORMAT_RISK MATRIX) shall be carried out first considering existing control measures preexisting or available with contractors. If risk is significant (is in orange or red zone), it is compulsory for permit applicant to identify additional control measures and redo the risk assessment.
	While identifying additional control measure(s), hierarchy of establishing controls shall be taken into consideration. Administrative controls, PPE or any other operator/technician (human) dependent control is not considered as strong controls.

	JSA (Hazard Identification) and Risk Assessment shall be documented in format prescribed by Hindalco (Annexure B). The format shall be attached with the permit to work for which permit is applied to area / package owner
2.4.3	**Inspections, testing and tagging**
	1. Periodic inspections and testing: The contractor must ensure quarterly inspections, through his/her authorized person / subject matter experts (SMEs) authorized by Hindalco of all gadgets & equipment and shall label them according to the following table. The gadgets and equipment shall include, but not limited to welding machines, cutting sets, power tools, power distribution boards, ladders, portable fire extinguishers, fall protection equipment, lifting and rigging equipment like slings, web-slings, chains & shackles and scaffold couplings and tubes

Quarter 1 (Jan to March)	Red Colour sticker / label / Band
Quarter 2 (April to June)	Blue Colour sticker / label / Band
Quarter 3 (July to Sept)	Yellow Colour sticker / label / Band
Quarter 4 (Oct to Dec)	Green Colour sticker / label / Band

2. Statutory inspections / HPT testing etc.: Contractor must maintain register of applicable legal requirements for his gadgets and equipment. The register shall include following but not limited to

SN	Gadget / Equipment	Frequency	Objective evidence
1	Web slings	Yearly	Certificate from Competent Person
	Metal wire slings	Yearly	Certificate from Competent Person
	Chain slings	Yearly	Certificate from Competent Person
	Chain pully blocks	Yearly	Certificate from Competent Person
	Full body harness	Yearly	Certificate from Competent Person
	Lifting Jacks	Yearly	Certificate from Competent Person
	Crane (lifting machine)	Yearly	Certificate from Competent Person
	Vehicle road fitness	Yearly	Certificate from Competent Person

			ABC type fire extinguishers	Monthly Inspection & HPT once three years	Register entry for monthly inspection and HPT certificate from authorised party
			CO2 fire extinguishers	Monthly Inspection & HPT once three years	Register entry for monthly inspection and HPT certificate from PESO authorised party indicating permanent expansion & loss of tear weight
			Oxygen Gas cylinders	HPT once five years	HPT certificate from PESO authorised party indicating permanent expansion & loss of tear weight
			Argon Gas cylinder	HPT once five years	HPT certificate from PESO authorised party indicating permanent expansion & loss of tear weight
			Dissolved Acetylene Cylinder	Inspection once five years	Inspection certificate from PESO authorised party.
			Portable gas detectors	Monthly	Register entry duly countersigned by official from building admin.
			Residual Current Circuit Breaker (RCCB) or Earth Leakage Circuit Braker (ELCB)	Quarterly	Register Entry / Field labelling by authorised persons from Electrical Department.
			Smoke Fire Detectors	Once a quarter using aerosol.	Register entry.
	Special Gadgets / Equipment / Facility inspection & Testing				
	Contractor shall have certified scaffold erector(s) to erect scaffold as prescribed by . While erection of the scaffold is on, under erection scaffold shall be tagged orange colour tag. On scaffold, tagged with orange colour tag, only authorised scaffold erector(s) shall be allowed to work. Post completion of scaffold erection it shall be inspected by qualified, certified and authorized scaffold inspector. Green tag shall be attached in place of the orange tag if it is approved by the scaffold inspector for use or else orange tag shall be replaced with Red Tag. Nobody shall be allowed to use red tagged scaffold.				

Red tagged scaffold shall be reoffered to the scaffold inspector post correction of faults in it and shall be used only after clearance by the scaffold erector and after placing green tag.

2.4.4 **Special Precautions for High-Risk activities like work at height, confined space entry, excavation, lifting heavy/asymmetric loads-**

All High-risk activities shall be addressed through hierarchy of controls as per priority of risk mitigation plan.

1. Elimination
2. Substitution
3. Isolation
4. Engineering control
5. Administrative control
6. PPE

By ensuring the 100% HIL PTW procedure as per HIL/CORP/MCoE-SFT/QP/032 Guidelines and specific work permit formats.

General Work & Equipment Clearance Work Permit From HIL-PWF-1	 General Work & EC permit_HIL-PWF-1 RE
Hot Work Permit HIL-PWF-2	 Hot work Permit_HIL-PWF-2 RE
Work at Height Permit HIL-PWF-3	 Work at Height Permit_HIL-PWF-3 RE
Excavation Permit HIL-PWF-4	 Excavation Permit_HIL-PWF-4 RE
Electrical Work Permit HIL-PWF-5	 Electrical Permit_HIL-PWF-5 RI
Confined Space Entry HIL-PWF-6	 Confined Space Work Permit_HIL-PWF-7 RE
Hazchem pipeline breaking and equipment opening HIL-PWF-7	 Hazardous C Pipeline Breaking -HIL-PWF-6
Heavy and Asymmetric Material/Load Lift HIL-PWF-8	Not Approved

2.4.5	**Requirement of Safety Professionals and safety supervisors:** Each contractor employing five hundred and more employees (worker and staff together) shall employ one qualified safety professional and one qualified safety supervisor per hundred employees. Qualification of safety officer and safety supervisor as stated below. Safety Officer: B.Tech./ B.E. in Mechanical/ Electrical/ Civil and ADIS/ PDIS from CLI/RLI or from state board of technical education with Five years of experience at large construction site post ADIS/ PDIS. Safety Supervisor: Bachelor of science in Physics, Chemistry, Maths group and ADIS/ PDIS from CLI/RLI or from State Board of Technical Education with three years of experience at large construction site post ADIS/ PDIS.
2.4.6	**Precautions during extreme weather condition:** One of the major challenges to meet Project timelines is safety concerns arising due to extreme weather conditions. As weather events like major storms and heatwaves seem to grow in severity and frequency each year, navigating the challenge of weather uncertainties is more important while planning of Projects. **A. Hot weather during summer:** Summer heat poses significant risks to construction workers, including heat exhaustion and heat stroke. It's essential to differentiate between the two and recognize the signs and symptoms early on. Heat exhaustion typically manifests as excessive sweating, weakness, nausea, and dizziness, while heat stroke is more severe and can lead to unconsciousness, seizures, and even death if left untreated. Here are some essential safety precautions for construction sites during the summer months: 1. **Hydration Stations:** Set up hydration stations throughout the site with plenty of water, electrolyte drinks, and shaded rest areas. Encourage workers to drink water frequently, even if they don't feel thirsty. 2. **Heat Awareness Training:** Conduct regular training sessions on heat-related illnesses, their symptoms, and preventive measures. Ensure all workers are aware of the risks. associated with working in high temperatures. 3. **Adjust Work Schedule:** Schedule strenuous tasks for cooler parts of the day, such as early morning or late afternoon. Minimize outdoor work during peak sun hours (typically between 11 a.m. and 3 p.m.). 4. **Personal Protective Equipment (PPE):** Provide and enforce the use of appropriate PPE for hot weather, such as lightweight, breathable clothing, wide-brimmed hats, sunglasses, and sunscreen with high SPF.

5. **Frequent Breaks:** Implement a frequent break schedule to allow workers to rest in shaded or air-conditioned areas. Encourage them to take short breaks to cool down and hydrate regularly.
6. **Monitoring Signs of Heat Illness:** Train supervisors to recognize signs of heat-related illnesses such as heat exhaustion or heat stroke. Have a protocol in place for immediate medical attention if someone shows symptoms.
7. **Ventilation and Cooling Measures:** Utilize fans, misting systems, or portable air conditioning units to provide relief in enclosed or indoor work areas. Ensure proper ventilation in confined spaces to prevent heat buildup.
8. **Lighter Workload:** Consider reducing the workload or extending project timelines during extreme heat conditions to minimize the risk of heat-related incidents.
9. **Regular Inspections:** Conduct regular inspections of the site to identify potential hazards related to heat exposure, such as hot surfaces, inadequate ventilation, or insufficient shade.
10. **Emergency Response Plan:** Develop and communicate a comprehensive emergency response plan specific to heat-related incidents. Ensure all workers know whom to contact and what steps to take in case of an emergency.
11. **Stay Informed:** Monitor weather forecasts and heat advisories regularly. Adjust safety measures accordingly based on changing weather conditions.

    By implementing these precautions, contractors can ensure the safety and well-being of workers on construction sites during the hot summer months.

B. High speed wind and storms:

Contractors must anticipate and act ahead of weather-related events to implement necessary safety measures that protect both the construction site and the public. The following key actions should be taken before severe weather impacts a project:

High Speed Wind Preparedness Plan

A comprehensive high-wind preparedness plan should include:

1. **Task Planning** – Assess risks and schedule tasks accordingly.
2. **Pre-Storm Preparation** – Secure materials, equipment, and structures.
3. **Emergency Response Team** – Establish a team to handle crisis situations.
4. **Post-Storm Inspection & Repairs** – Evaluate and repair any damage after the storm.

Monitoring & Preparation

- Continuously track weather forecasts and advisories issued by India Meteorological Department (IMD) / National Centre for Medium Range Weather Forecasting (NCMRWF) / Indian Institute of Tropical Meteorology, Pune (IITM).
- System and team dedicated to keep track of Weather alerts on daily basis.
- Allocate sufficient time to secure materials, equipment, and the project site.
- Implement the high-wind preparedness plan before shutting down operations.

Site-Specific Safety Measures

1. Storage of Materials & Debris

- Store materials and debris at least 10 feet away from building perimeters unless enclosed.
- Secure materials using bands or tie-downs to prevent displacement.
- Remove loose materials from roofs, setbacks, and balconies.
- Ensure floor slab hole covers are securely anchored.
- Properly secure re-shores along open-sided building perimeters.

2. Masonry Walls Under Construction

- Secure and brace masonry under construction to prevent collapse.
- Pay special attention to perimeter masonry walls.
- Protect masonry openings from water infiltration.

3. Steel Framing

- Brace and secure steel frames and light gauge decking.
- Secure all planks to supporting structures.
- Remove loose bolts and cans from floors and leading edges.

4. Curtain Wall & Façade

- Secure and reposition curtain wall materials away from building perimeters.
- Ensure all installed units are properly anchored.

5. Concrete Construction Formwork

- Remove or secure formwork not weighed down by concrete.
- Secure loose formwork materials to prevent dislodgment.

6. Perimeter Netting, Guardrails & Cocoon Systems

- Clean, retract, and secure horizontal netting.
- Replace damaged netting to prevent flapping.
- Inspect and secure vertical perimeter netting, cabling, and guardrails.
- Ensure cocoon systems are properly secured per manufacturer or engineer recommendations.

7. Supported Scaffolds

- Remove debris and inspect tiebacks.
- Secure planking to prevent dislodgment.
- Consult engineers regarding netted scaffolding for wind load adjustments.

8. Suspended Scaffolds

- Lower scaffold rigs to the ground and secure them.
- Remove or secure lifelines to prevent damage.
- Shut off electrical power to hoist motors.

	9. Construction Fences & Barriers • Brace and secure fences for wind resistance. • Inspect and replace damaged components. **10. Sidewalk Sheds** • Remove debris from shed tops. • Secure planking and inspect parapets. **11. Excavation & Underpinning** • Conduct pre- and post-storm inspections. • Ensure support of excavation (SOE) systems are completed per approved plans. • Maintain dewatering operations with backup generators. **12. Tower Cranes** • Follow manufacturer wind action plans. • Inspect all tie-ins, collars, and base connections. • Protect the mast base to ensure proper drainage. • Raise hook blocks with no load before storms. **13. Mobile Cranes** • Retract booms, stow jibs, and secure the crane body. • Secure crawler cranes per manufacturer guidelines. **14. Exterior Hoists** • Secure mast connections, outriggers, and landing plates. • Remove debris from the hoist cab and surrounding area. • Shut down electrical power and cease operations in high winds. By proactively preparing and executing these measures, contractors can safeguard their construction sites and mitigate risks associated with extreme weather conditions
2.4.7	**Housekeeping, orderliness and cleanliness:** Following provisions must be ensured by the contractors: 1. Dedicated layout of allocated area for the contractor. 2. Contractor's facilities like Parking, Office, Lunch / Rest Rooms, Segregated Storages, Raw Materials, Construction goods, workshop etc. to be demarcated with proper fencing and VIS. 3. Disposal systems for all types of wastes including food, sewage, metallic, hazardous wastes etc. must be ensured through / legal means and assures through regular inspection and audits.

	4. Access pathways for all workers should always be maintained, free from any unsafe conditions like open drains, pits, exposed rebars, heavy / goods vehicles, cranes, hanging objects, etc. such that during shift change and break hours there should be no overcrowding. Before breaking any safe pathway, alternate safe pathways must be ensured with proper VIS to create proper visibility of new alternate route. 5. All vehicles, including passenger vehicles & two wheelers, must be parked only at a designated parking place. 6. Used items like empty drums, cans, epoxy / paint buckets, broken ladders, packaging materials like wood, steel strips, thermocol etc. must be stored safely and to be disposed as per / legal norms.
2.5	**Incident, accident capturing, reporting to Hindalco and investigation**
	Contractor shall capture and report each incident, accident or near miss either verbally or by text message or e-mail to Hindalco Site Management within four hours of happening.
	Providing medical attention and treatment to victim shall be priority in case of injury accident.
	Contractor shall preserve accident scenario / site till arrival of authorized Hindalco officials / safety professional if it is not providing ongoing threat.
	Investigation shall start as soon as possible, and first information report shall be furnished to Hindalco site management withing 24 hours.
	Hiding incident, near miss or accident is considered as one biggest safety violation shall result into capital punishment including termination or contract.
	At Hindalco, injury accidents are categorized as mentioned below.

Category of injury Accident	**Nature of Injury**
Cat 1	**First Aid Case (FAC)**
Cat 2	**MTC** or Health effects requiring medical treatment at a hospital or by an offsite medical practitioner
Cat 3	**RWC** or **health effects** including temporary partial disability / occupational illness, affecting work performance in the short to medium term. The injured can work but needs a different role than normal for a temporary period
Cat 4	**LTI** / Multiple RWC from an accident or occupational illness with irreversible health damage
Cat 5	One **Fatality** or more or **Total Permanent Disability** case

	For category Cat 5 and Cat 4 injury accidents and near-misses having potential Cat 5 and 4 type injuries, contractor shall have to involve Hindalco officials in

<table>
<tr><td></td><td>investigation and investigation shall be carried out using “TapRoot” methodology and software platform.</td></tr>
<tr><td></td><td>Cat 3,2 and Can 1 incident can be investigated by using “Why-Why” analysis or FMCA by team of official from contractor.</td></tr>
<tr><td></td><td>Investigation report of the incident shall be submitted by contractors within 10 days.</td></tr>
<tr><td></td><td>Each contractor, based on injury accidents happened in area under his/her control will have to calculate following safety indices. For this reason, accidents / incidents of subcontractors of the main contractors are considered as injuries on account of main contractor.
1. Loss Time Injuries Frequency Rate (LTIFR i.e. loss time injuries per million manhours work)
2. Loss Time Injuries Severity Rate (LTISR i.e. man-days lost due to loss time injuries per million manhours work)
3. Total Recordable Injury Frequency Rate (TRIFR i.e. Total Recordable injuries per million manhours work)</td></tr>
<tr><td></td><td>Each Contractor shall have to display their safety performance at prominent location outside their office in format prescribed below.</td></tr>
<tr><td></td><td><table><tr><td colspan="2">Name of Contractor:</td></tr><tr><td>No of Fatality</td><td></td></tr><tr><td>No of Loss Time Injuries</td><td></td></tr><tr><td>No of Recordable Injuries</td><td></td></tr><tr><td>LTIFR</td><td></td></tr><tr><td>LTISR</td><td></td></tr><tr><td>TRIFR</td><td></td></tr></table></td></tr>
<tr><td>2.6</td><td>Emergency and Emergency Response including Rescue</td></tr>
<tr><td></td><td>First aid centre for the Construction Workers

The following first aid services should be available at first aid centre:
1. Adherence to HIL’s First Aid and Emergency Handling procedures
2. Medical Surveillance and Bio-monitoring
3. Proper Occupational Health Centre providing Emergency Care Services and management
4. Adequate wholesome potable drinking water
5. Proper Sanitation services
6. First Aid services including First Aid Boxes and Appliances, Ambulance Room (if available at site)
7. Immunization Services
8. Ambulance Services
9. Referral Services
10. Health education including advisory services on personal hygiene, environmental sanitation and safety</td></tr>
</table>

	11. Medical record, upkeep and maintenance 12. Notification of occupational diseases, poisoning etc. to the concerned HIL administration 13. Others as decided by the Competent Authority
	Following requirements must be ensured to meet emergency at every Contractor's site: 1. Cardio-Pulmonary Resuscitation (CPR) trained persons 2. A First Aid Kit / An automated external defibrillator (AED) 3. Advance full body harness for work at height equipped with suspension trauma device 4. Minimum two sets of self-contained breathing apparatus (SCBA) are required for contractor's workers rescue who are expected to work in confines space / vessels / pits 5. Multipurpose ABC Portable Fire Extinguishers of 10 / 5 Kg capacity 6. Ambulance facility to cater "Golden Hour" in case of Serious injury or Health conditions. 7. Rescue teams having rescue kit, training about all high-risk activities and IRATA certification. They can provide rescue in case of emergencies like confined space entrapment, engulfment, fall from height, drowning etc. For detailed specification and requirements for Hiring Rescue Team is as per **Annexure-D:** Specifications for Hiring Rescue Agency.
3.0	**Deviation / Exemption from requirement of :** **In case of any deviation or exemption needed from this , a Management of Change (MOC) Approval must be obtained from the Project Head and communicated to Corporate Safety at all stages of MOC.**

	Attachment 1
	GENERAL / COLD WORK PERMIT
	Refer Permit to Work System procedure with Permit to Work Form, HIL-PWF-1 (SHEET 1 & 2)
	Safety Precautions for General / Cold Work Permit
	The following precautions (though not necessarily exhaustive) should be observed in relation to the performance of General / Cold Work permit:
	1) For work involving the opening-up or de-energizing of equipment, the Lock, Tag and Try Procedure must be followed.
	2) If equipment is to be opened up, it should first be depressurized, drained and purged of hazardous material under valve isolation, before positive mechanical isolation can be achieved.
	The effectiveness of the valve isolation should be tested and if it is found that a valve is passing, appropriate measures will have to be adopted. These may include shutting additional valves or taking further equipment out of commission, The possibility of the presence of wax or ice under a valve should be considered, as subsequent melting would defeat the isolation. Where valve isolation is used, the valves should be locked off with chain and padlock or other equally effective device, to ensure that they are not opened inadvertently.
	3) If toxic gases could be present, suitable breathing apparatus should be specified.
	4) The possibility of the presence of pyrophoric material should be considered before admitting air. If necessary, the equipment should be water flushed/filled before opening up and wetted down afterwards.
	5) Where hazardous materials such as hydrocarbons and chemicals are involved, mechanical isolation should consist of spading, blanking or disconnecting.
	6) An exception to this requirement would be some cases of minor work when locked off valving would suffice, providing the isolation is proved to be effective by opening drains on the equipment and proving those drains to be clear.

	7) This exception is not made in the interests of expediency but recognizes that swinging spades or making disconnection can be equally, or more hazardous, than some examples of minor work.
	8) Work should not be attempted on any equipment where the possibility exists of hot material escaping, e.g. Temperature exceeds its flash point, boiling point or auto-ignition temperature. The material should be allowed to cool before draining and extra care shall be exercised when checking isolation integrity.
	9) Particular care is required in achieving and proving isolation when equipment operates under a vacuum
	10) Wherever practicable, a formal maintenance preparation procedure should be written for any equipment where hazards such as hot material or vacuum operation are encountered.
	11) Where driven machinery is to be worked on, the prime mover should be positively isolated and any switch gear locked off as per the Lock, Tag and Try Procedure.
	12) Appropriate protective equipment must be specified.
	13) The area around any work site must be appropriately identified and barricaded, if necessary, to prevent other personnel in or passing through the area from being exposed to hazards.

	Attachment-2
	HOT WORK PERMIT
	Refer Permit to Work System procedure with Permit to Work Form, HIL-PWF-1 (SHEET 1 & 2)
	Safety Precautions for Hot Work Permit
	Whenever possible, Hot Work should be avoided in hazardous areas within operational hydrocarbon processing facilities. If Hot Work cannot be avoided, the following are recommended precautions that should be observed:
	1) A valid, authorized and approved Hot Work Permit must be issued with a clearly defined declaration that it is safe to commence the intended work.
	2) All relevant isolations described on the Hot Work Permit should be validated.
	3) The equipment to be worked on shall be positively isolated, both mechanically and electrically. Mechanical isolation shall be achieved either by disconnection, or by blanking following the isolation procedure.
	4) The equipment shall be freed of liquid and gas by depressurizing, draining, venting, purging and flushing.
	5) In lined vessels or equipment containing pockets, recesses, double bulkheads, etc. precautions shall be taken to ensure that no material is trapped behind the lining. This may require cold drilling and steaming through behind the lining followed by gas testing. Where it is not possible to achieve gas free in the equipment or there is a doubt that all potentially hazardous materials have been removed, the space shall be made inert with nitrogen or water filled during hot work.
	6) Any combustible material, including paper cartons, oily rugs and grass, located nearby shall be removed. Oil spills or deposits around the work site shall be cleaned up. Where it is not practical to remove combustible materials they shall be suitably covered or wetted with water.
	7) Drain covers and surface manhole covers within 15 m from the work site shall be properly sealed throughout the work period to prevent emission of flammable vapours
	8) Any potential source of flammable gas or vapor emission, such as sampling point, vent or drain situated within 15m of the work site shall be rendered safe by sealing. If there is a potential release of flammable gas or vapor in the vicinity of hot work, it may be necessary to monitor the atmosphere using continuous gas monitors which will alarm on detection.

	9) The results of the initial gas test and the requirements for ongoing monitoring must be clearly defined on the Hot Work Permit.
	10) When in a Zone 1 or 2 hazardous areas, continuous gas monitoring should be considered.
	11) For welding, grinding and other allied processes, the following specific precautions should be followed.
	12) The area should be inspected and verified that it is free of combustibles and monitored during Hot Work, to detect vapours resulting from the work.
	13) All open drains in the area should be covered. All potential sources of flammable vapour/ liquid in the area, such as vents, sample points, drains and relief valves, should be checked and made safe.
	14) Suitable fire suppression equipment such as a fully charged extinguisher and, where possible, a fire hose should be run out and pressured up.
	15) In process areas, sparks must be totally contained by a habitat to prevent them from dropping below or travelling some distance from the worksite.
	16) When the exposure period is long, or the potential for a gas release high, a suitable pressurized welding habitat should be constructed. This habitat should be pressurised with air from a safe source.
	17) A nominated competent Fire Safety Watcher must be in attendance whenever the work being carried out requires the use of a naked flame or involves welding, grinding or allied processes.
	18) Clear instructions must be given to the Permit Holder and the nominated Fire Safety Watcher with regard to the procedure to be followed in the event of an emergency. This should include the requirement to immediately stop work in the event of an emergency alarm, and not to commence work again until the Permit to Work has been re-validated.
	19) Flammable and ignitable materials and debris have been moved at least 35 feet from the hot work area or covered and protected with fire resistant material or else fire watch provided. (Combustibles within 30 feet of the work area have been shielded from sparks and open flames).
	20) Ducts, conveyor systems, and augers that might carry sparks to distant combustibles must be protected or shut down
	21) If welding is to be done on a metal wall, partition, ceiling, or roof, precautions must be taken to prevent ignition of combustibles on the other side, due to conduction or radiation of heat

	22) Smoke/fire detectors/alarms in the immediate area of the hot work have been temporarily disabled until the hot work is completed.
	23) Adequate ventilation is being used (especially when welding/cutting materials with painted or metal coated surfaces).
	24) Cracks or holes in floors, walls, and ceilings (including ductwork) are covered or plugged
	25) Welders have been protected from electrical hazards. Metal equipment and materials have been adequately grounded.
	26) Hot work equipment is operable and in good repair. Gas cylinders have been leak tested.
	27) Welding machines have been inspected.
	28) A multi-purpose dry chemical, portable fire extinguisher must be located such that it is immediately available to the work and is fully charged and ready for use.
	29) Respiratory protection is mandatory unless an adequate monitored airflow away from the welder and others present can be established and maintained
	<u>Fire watch/hot work area monitoring.</u>
	• **Fire watch will be provided during and continuously for 30 minutes after work, including during any work breaks.** • Fire watch is supplied with suitable types of extinguishers. • Fire watch is trained in use of this equipment and in sounding alarm. • Fire watch may be required for adjoining areas, above and below. • Hot work area inspected 30 minutes after job is completed. • Cell phone or radio to dial Fire Station Number is available.

	Attachment-3
	CONFINED SPACE ENTRY PERMIT
	Refer Permit to Work System procedure with Hot Work / Confine Space Work Permit to Work Form, HIL-PWF-1 (SHEET 1 & 2)
	1) Confined Space Entry Preparation
	• Entry into a permit-required confined space shall not be made unless an entry supervisor has assured that the following procedures have first been completed: ◆ An entry permit is initiated by signing the Confined Space Entry Log, obtain a blank Entry Permit and fill it out. The permit will indicate: ◆ The specific confined space to be entered. ◆ Nature of work is to be performed. • The length of time estimated to complete the work. Permits are only valid for 8 hours. A permit may be extended for another 8 hours provided that acceptable conditions are re-certified and test results entered on the permit. ◆ What date and time the work will be started. ◆ What personnel, names and titles, will perform the work. ◆ Name and title of person acting as the "Attendant". ◆ All pumps or lines which may convey flammable, injurious, or incapacitating substances into the confined space shall be disconnected, blinded, (double blocked or bled), or effectively isolated by other means to prevent the development of dangerous levels of air contamination or oxygen deficiency within the space. The closing of valves alone, or the closing of valves and locking or tagging of them, is not considered effective protection. The disconnection or blind shall be so located or done in such a manner that inadvertent reconnection of the line or removal of the blind is effectively prevented. ◆ The atmospheric testing equipment must be "field checked" prior to testing the atmosphere in the confined space. ◆ Atmospheric testing must be conducted for oxygen levels between 19.5% and 23.0% by volume and the percentage found is to be entered on the permit. The last calibration date of the oxygen detector must be entered on the permit. ◆ Atmospheric testing must be conducted for flammable gas, vapors or mists in excess of 10% of its LEL and results noted on the permit. The last calibration date of the combustible gas indicator must be entered on the permit. ◆ The confined space must be flushed or emptied of all dangerous substances and then tested for known toxic substances for the Permissible Exposure Limit (PEL) ◆ Enter the value of the PEL on the permit. ◆ Electrical and mechanical hazards must be removed or prevented from causing a hazardous situation.

- Associates entering a permit-required confined space with a hazardous atmosphere must be provided with an appropriate retrieval device, retrieval line and an appropriate respirator. The associate must have received and have documented training on the use of a respirator.

2) If a hazardous atmosphere is present atmosphere testing shall be conducted every hour that the confined space is occupied and results noted on the permit.
3) If there is a problem, necessary action shall be taken to ensure the safety of those involved. The attendant is to contact the applicable rescue team and inform them of the conditions when they arrive on the scene.
NOTE: Under NO circumstances is the attendant to enter the confined space.
4) When the work has been completed the Entry Supervisor shall sign the permit as being completed and all conditions in the confined space have been returned to normal, the space is closed and properly marked.

5) Entry into Vessel or Confined Space

5.1) The PA shall inform the AO when they are ready to enter the confined space. At this time, the authorized gas tester will recheck the atmospheric conditions to re-establish the safe conditions prior to the initial entry.

5.2) Each entrant, when entering a vessel or confined space, must print their name in full, and indicate the time on the vessel and confined space entry log. When exiting, they must initial the log and indicate the time.

5.3) Both PA and AO shall closely monitor the space through attendant to ensure that all safety requirements and permit conditions are maintained.

5.4) The authorized gas testers will carry out gas tests at the specified frequency and record the results on the permit until the work is completed.

6) Job Completion and Acceptance

6.1) When the job is completed, the Performing Authority and attendant ensures that all personnel have left the vessel or confined space before signing off the work permit and returning it to the Facility Owner.

6.2) The Facility Owner/Approving Authority shall check the job site to confirm that all personnel have exited from the vessel or confined space. He will also ensure that all other associated permits are returned for cancellation and then will sign-off all three copies to show that the permit is now withdrawn.

All personnel (including contractors) entering a vessel or confined space and attendant / standby personnel, shall be instructed as to the nature of the hazards, precautions to be taken, the use of protective and emergency equipment and the emergency escape route.

Safety Precautions for Vessel and Confined Space Entry

The following precautions (though not necessarily exhaustive) should be observed in relation to the entry into vessel and confined space:

The vessel or confined space must be properly purged, cleared, and positively isolated from all process and utility systems by physically disconnecting the piping or by blanking.

Isolation should be as close to the vessel as is practical. If lines are isolated remote from the vessel, then it must be insured that the line from the isolation point to the vessel has been cleared and remains free of process material or energy sources.

Blanks must be designed to withstand the operating pressure of the process or source of energy and fabricated of material compatible with the process. For larger diameter blanks, where installation is impractical, an alternate method may be used to insure that a pressure increase upstream of the blank does not rupture the blank.

Proper tagging and locking must be completed before any work is started.

If the vessel is equipped with power driven internal appliances such as mixers, the switchgear should be disconnected, locked and tagged. If the vessel contains electrical conductors, they must be properly earthed, screened etc., before entry. An Electrical Work Permit is required for the above job.

Electric tools, lights, and equipment used in vessel entry shall be operated at 24 volts or 240V if protected with an Earth Leakage Circuit Breaker (ELCB) or Residual Current Circuit Breaker rated at 10mA tripping value. Where possible, electrical leads should be routed through an opening other than the opening used for entry of people.

Consideration should be given to the possible sources of flammable or toxic gases in the environment outside the vessel or confined space and precautions

	taken accordingly. Examples of sources are drains, sample points, vents, relief valve outlets etc. The possibility of flammable, explosive, or toxic materials which may have been absorbed in the shell material and may be released on heating must be considered prior to burning or welding. All surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 0.6m from the area of heat application or employees shall be protected by air-supplied respirators and if applicable, protective clothing. Burning shall be done only with the cylinders located outside the space and hose connections shall be checked for leakage prior to making entry. Remove all hoses from the space or disconnect the hoses from the cylinders at the end of work, during lunch periods, etc. Welding shall be done only with welding machines left outside the space. Depending on the nature of the entry, the work being carried out and the protective equipment being worn, it may be necessary to restrict the length of time personnel may remain in the enclosed space without a break.	
	Adequate ventilation must be maintained throughout the period of work within the enclosed space. Each task must be assessed to ensure the adequacy of the ventilation and if necessary to consider using educator / blower.	
	Entry is only authorized when all deposits, scale and sludge liable to give off dangerous vapor have been removed. The air inside the confined space must be monitored constantly at an interval of not more than 2 hours and the results recorded and displayed at the entry point of the enclosed space. Tests shall be made first for Oxygen content, then explosibility, and then toxic vapors or gas. Oxygen content must be between 19.5% to 21% and the atmosphere free from flammable gases (0% LEL) and hazardous concentration of toxic vapors or dusts. Gas monitoring must be conducted in locations where it is representative of the atmosphere. The gas tests shall be carried out again just before re-entry if the workers leave the vessel for tea or lunch break.	

	A full body harness must be worn by each individual entering a vessel or confined space. A lifeline shall be attached to the harness of at least one person in the work group. A spare full body harness and lifeline must be provided at the entry point. If the configuration of the vessel or the large number of people and locations involved render an attached lifeline impracticable, a minimum of 2 lifelines must be kept ready at the vessel entry point.
	At least one standby person must be at each opening used to enter the confined space. A 30-minute self-contained breathing apparatus or air supplied respirator with separate self-contained five-minute emergency escape set, a flashlight, and a horn or some other reliable methods for summoning additional assistance must be readily available. The standby man's primary responsibility is to be attentive to the personnel inside the confined space.
	A rescue plan must be developed for each vessel or confined space entry to enable timely rescue of individuals if an emergency occurs. The rescue plan shall include: ◆ How to summon the rescue team in a timely manner including designated alarm box ◆ What methods of rescue must be implemented to retrieve individuals ◆ Type and availability of, and responsibility for equipment needed for rescue ◆ Potential chemical and physical hazards of the area and of the vessel or confined space. All applicable MSDS sheets must be attached. ◆ Information and drawing of vessel or confined space configuration (e.g. detail drawing showing vessel height, diameter, number and size of manways, distance between platforms, etc.) ◆ Area map showing location of vessel or confined space. ◆ Availability of a mechanical means, such as a tripod with a lifting device for removing a person from the confined space, if the person is 1.5m or more below the opening to the confined space. While working inside a vessel or confined space access to lower levels should be restricted if overhead work endanger personnel working at the lower level. Portable ladders used for access and egress shall be kept in place at the vessel entry point throughout the work period.

Hazard	Location	Condition	Symptoms	Sources
Oxygen Deficiency	Electrical pits, silos, sewers, valve pits, tanks, sumps	Normal air = 20.9% Oxygen OSHA safe entry limit ≥ 19.5%	Headaches, ringing in the ears, confusion, difficulty breathing, loss of muscle control, unconsciousness	Corrosion of metal, replaced by gases generated by organic digestion
Oxygen Enrichment	Any enclosed space	OSHA maximum safe entry limit ≤ 23.5% Oxygen	None, extreme fire or explosion hazard	Oxygen from an oxy-acetylene torch
Toxic Chemical Exposure	Building sewer systems, infiltration into the space form a leaking source	OSHA PEL=s or ACGIH TLV=s	Usually accompanies by strong odors or eye and throat irritation with headache and nausea	Volatile solvents, welding fumes, paint vapors, combustion gases, or organic decay
Electrical & Mechanical	Exposed live wiring, tanks or vats containing rotating shafts	Non-zero energy state (Use lockout/Tag-out Procedures)	Electrocution or physical trauma to the body	High voltage pits, mixing tanks, process vessels
Heat Stress/ Burns	Steam tunnels, crawl spaces with steam or hot water	High ambient temperatures or physical contact with hot surfaces or hot water or steam	Heat cramps, heat exhaustion, heat stroke, burns	Steam tunnels, power plant boilers, hot process tanks
Explosive	Sanitary sewers, fuel storage tanks	Flammable or explosive range in air. OSHA safe entry limit ≥ 10% of the LEL	Same as an oxygen deficient atmosphere or chemical exposure	Decaying organic wastes, solvents

Atmosphere				
Fall Protection	All vertical locations ≥ 4 feet in depth	No permanently fixed ladder, wet or uneven internal surfaces	Severe physical injury	Pits, sumps, vats, tanks

Confined Space Decision Matrix

CONFINED SPACE OPENING	Atmosphere Guaranteed Safe to Breathe	Atmosphere NOT Guaranteed Safe to Breathe
Vertical - Unrestricted	Body Harness Life line if possible. Safety tackle must be on hand.	Self-contained breathing apparatus, body harness and attached life line. Safety tackle must be in position.
Vertical – Restricted (*less than 18" in any dimension)*	In addition to body harness a wrist harness and Life line if possible. Safety tackle must be on hand.	Self-contained breathing apparatus, body & wrist harness and attached life line. Safety tackle must be in position.
Horizontal - Unrestricted	Body harness. Life line if possible.	Self-contained breathing apparatus. Body harness and attached life line.
Horizontal - Restricted (*less than 18" in any dimension)*	Body & wrist harness. Life line if possible.	Self-contained breathing apparatus, body & wrist harness and attached life line.
Boiler or vapourizer (*special case as interior configuration prevents rescue by pulling on harness).*	Sked stretcher and personnel trained in its use must be at hand during vessel entry.	NO ENTRY MAY BE ATTEMPTED.

Attachment-4

Electrical Work Permit

Refer Permit to Work System procedure with Electrical Permit to Work Form, HIL-PWF-1 (SHEET 1 & 2)

Electrical Hot Work

Electrical Hot Work on equipment rated more than 240 VAC to ground is strictly prohibited.

If Electrical Hot Work to be done at voltages above 120VAC up to 240 VAC to ground, the following conditions must be met:

Supervision of the person assigned to do the work and/or the Plant Electrical Engineer must personally survey the job with the person that will be doing the work to identify alternative methods necessary to avoid working on exposed energized electrical conductors or circuit parts that have not been placed in an electrically safe working condition.

Only qualified persons shall be permitted to work on electrical conductors or circuit parts that have not been placed in an electrical safe work condition, and the qualified person(s) must agree that the job can be performed safely. A standby person shall be required.

A hazard/risk analysis of the task shall be conducted to determine the electrical safe approach distances associated with the task.

A detailed job plan written specifically for the task should be prepared. The job plan should list:

- A step-by-step outline of the work to be performed.
- The required personal protective equipment and any other safety-related instructions (ie, body positioning).
- Any additional safety equipment required.
- An Emergency Response Plan which identifies the location of the nearest phone and lists emergency numbers.

The supervisor of the persons assigned to perform the work or a member of the site's Electrical Safety Team shall verify that the persons have:

- Thorough job instructions and a complete understanding of the work to be done.
- Thorough safety instructions.
- Appropriate tools and safety equipment.

Supervision of the persons assigned to do the work and/or the Plant Electrical Engineer shall be present at the job location, initiate the procedure when all safety requirements have been completed, and remain at the job location until the work is complete. At least one other person qualified in CPR and having knowledge of how the circuit can be de-energized must be present.

Electrical Proximity Work

Electrical Proximity Work on 240 Vac or more to ground is strictly prohibited. When restricted work at voltages above 120VAC up to 240VAC to ground cannot be avoided the person(s) performing the task shall:

- Have approval of the responsible E & I supervisor or the shift leader if the conductors or circuit parts are energized at greater than 120 volts nominal.
- Perform an electrical hazards/risk analysis to determine the degree and extent of the hazard, required level of job planning, and the appropriate PPE for the job.
- Voltage rated gloves and rubber mat (electrically rated for >=1000V) are required.
- Where possible, install a physical, insulated barrier to prevent inadvertent contact with exposed energized conductors or circuit parts.
- Have a standby person if the work involves conductors or circuit parts, energized above 120 volts nominal.

Electrical Hazardous Work:

When Electrical Hazardous work is required, the person performing the task shall:

- Be a "Qualified Person".
- Perform a hazard/risk analysis to determine the degree and extent of the hazard, required level of job planning, and the appropriate PPE for the job.
- If the need arises for an unqualified person to cross the hazardous approach boundary perform a minor task, or to look at equipment, a qualified person must advise him or her of the possible hazards and the appropriate PPE and ensure that person is otherwise safeguarded.

NOTE: Under no circumstances shall an unqualified person be allowed to cross the Proximity approach boundary.

Attachment-5

Excavation Work Permit

Refer Permit to Work System procedure with Excavation Work Permit Form, HIL-PWF-3

An Excavation Work Permit serves as a clearance to carry out excavation work in conjunction with an appropriate work permit such as Cold Work Permit or Hot Work Permit, etc.

Any excavation work to be carried out on Hindalco site that exceeds 15 cm into the ground shall be covered by an Excavation Work Permit. This includes planting of trees, installation of road signs or flag poles and driving of piles which involves digging or breaking of earth. However, any use of mechanical excavator will require an Excavation Work Permit regardless of depth. An Excavation Work Permit is also required for work involving breaking or drilling of concrete including wall of buildings with concealed wiring

The following safety precautions, though not necessarily exhaustive, shall be observed where applicable in the course of excavation work to prevent injury and property damage:

1. Before an attempt is made to excavate, the Performing Authority must know the exact locations of underground facilities.
2. No excavator or other digging machine shall be allowed to excavate close to underground facilities that must be left in place. A proximity limit for machine operations shall be established and the excavation completed by hand digging. When work has to be done over or around electrical cables, special precautions must be stated in the permit. If the underground cables, service tiles or any other piping are discovered in the course of excavation, the job must be suspended and the Approving Authority must be notified immediately. When mechanical excavator is used, a full-time contractor supervisor must be present at the site to guide the operator of the excavator and supervise the excavation. Close proximity digging with any machinery SHALL require a Hindalco person who is knowledgeable of the underground facilities.
3. Where a trench to be excavated exceeds 1.5m in depth, adequate piling, shoring and bracing shall be provided against the bank or side to prevent it from collapsing.

Piling, shoring and bracing used in a trench excavation to protect persons against falling or sliding material shall be of adequate strength. Planks used as sheet piling shall be at least 50mm thick. The maximum spacing between horizontal stringers or wales shall be such as to keep the planks within their safe bending stress. Shores and braces shall be of adequate dimensions for stiffness and shall be so placed as to be effective for their intended purposes. Each end of each stringer piece shall be separately braced.

Where trenching of more than 4 m in depth is done, such protection shall be constructed in accordance with the design and drawings of a professional engineer.

4. In every excavation exceeding 1.2m in depth, there shall be provided ladders, stairways or ramps to furnish safe access to and egress from such excavation.
5. Excavated material should be placed at least 0.6m from the edge of the excavation, unless toe boards or other effective barricades have been installed to prevent fallback. The excavated material should be kept away from the drains and access ways.
6. Open sides of an excavation where a person may fall in shall be guarded by adequate protective barricades and suitable warning signs shall be put up at conspicuous positions. If the trench is 3m or deeper, barricades made of rigid materials instead of ropes must be used. Covering of trench with canvas sheet or the like without such barricades is strictly prohibited.
7. Pick-and-shovel people working in excavations should be kept far enough apart to prevent injury to one another.
8. All road-crossing trenches must be covered by steel plates of sufficient strength for vehicles to pass through.
9. Vessel and Confined Space Entry Permit may be required before any person is allowed to enter a trench exceeding 1.5m in depth as the atmosphere in it may not be safe for entry. Special attention should be paid to those trenches being dug within process area or any place where there are possible sources of flammable or toxic gas emission. Such emission sources may be from the nearby equipment or the pipes underneath the trenches.

Excavation Checklist

1. **General Inspection of Jobsite:**
   - A. Excavations, adjacent areas, and protective systems inspected by a competent person daily before the start of work.
   - B. Competent person has the authority to remove employees from the excavation immediately.
   - C. Surface encumbrances removed or supported.
   - D. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.
   - E. Hard hats worn by all employees.
   - F. Spoils, materials, and equipment set back at least two feet from the edge of the excavation.
   - G. Barriers provided at all remotely located excavations, wells, pits, shafts, etc.
   - H. Walkways and bridges over excavations four feet or more in depth are equipped with guardrails and toeboards.
   - I. Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic.
   - J. Employees required to stand away from vehicles being loaded or unloaded.
   - K. Warning system established and utilized when mobile equipment is operating near the edge of the excavation.
   - L. Employees prohibited from going under suspended loads.
   - M. Employees prohibited from working on the faces of slopes or benched excavations above other employees.
2. **Utilities:**
   - A. Utility companies contacted and/or utilities located.
   - B. Exact location of utilities marked.
   - C. Underground installations protected, supported, or removed when excavation is open.
3. **Means of Access and Egress:**
   - A. Lateral travel to means of egress no greater than 25 feet in excavations four feet or more in depth.

B. Ladders used in excavations secured and extended three feet above the edge of the trench.

C. Structural ramps used by employees designed by a competent person.

D. Structural ramps used for equipment designed by a registered professional engineer (RPE).

E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with no-slip surface.

F. Employees protected from cave-ins when entering or exiting the excavation.

4. Wet Conditions:

A. Precautions take to protect employees from the accumulation of water.

B. Water removal equipment monitored by a competent person.

C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation.

D. Inspections made after every rainstorm or other hazard-increasing occurrence.

5. Hazardous Atmosphere:

A. Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard.

B. Adequate precautions taken to protect employees from exposure to an atmosphere containing less than 19.5% oxygen and/or to other hazardous atmospheres.

C. Ventilation provided to prevent employee exposure to an atmosphere containing flammable gas in excess of 10% of the lower explosive limit of the gas.

D. Testing conducted often to ensure that the atmosphere remains safe.

E. Emergency equipment, such as breathing apparatus, safety harness and lifeline, and/or basket stretcher readily available where hazardous atmospheres could or do exist.

F. Employees trained to use personal protective and other rescue equipment.

G. Safety harness and lifeline used and individually attended when entering bell bottom or other deep confined excavations.

	6. Support Systems:	
	A. Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads.	
	B. Materials and equipment used for protective systems inspected and in good condition.	
	C. Materials and equipment not in good condition have been removed from service.	
	D. Damaged materials and equipment used for protective systems inspected by a registered professional engineer (RPE) after repairs and before being placed back into service.	
	E. Protective systems installed without exposing employees to the hazards of cave-ins, collapses, or threat of being struck by materials or equipment.	
	F. Members of support system securely fastened to prevent failure.	
	G. Support systems provided in ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.	
	H. Excavations below the level of the base or footing supported, approved by an RPE.	
	I. Removal of support systems progresses from the bottom and members are released slowly as to note any indication of possible failure.	
	J. Backfilling progresses with removal of support system.	
	K. Excavation of material to a level no greater than two feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.	
	L. Shield system placed to prevent lateral movement.	
	M. Employees are prohibited from remaining in shield system during vertical movement.	

	Attachment-6	
	Work at Height Work Permit	
	Refer Permit to Work System procedure with Work at Height Permit Form, HIL-PWF-2	
	The following Hazards may be encountered during the work at height: • above or below ground level fall > 2M	
	• on roof/ floor / platforms/ pipe racks or walls	
	• near open edges of roofs/ floors, tanks or openings in roofs, floors or walls	
	• at height using equipment (MEWP, tower scaffolds, ladder, stepladders, harnesses	
	• near or adjacent to fragile materials	
	• near unguarded shafts or excavations or trenches, pits	
	• on unstable structure or erecting scaffolds	
	• on fragile/ brittle / sloping/ uneven/ unstable/ wet / slippery surfaces or open-edges	
	• on mezzanine level with no guards/ handrail	
	• confined work space / low ceiling / restricted access or egress / limited walking surface	
	• near live cables / coverhead power lines	
	• roof/ platform/ racks structures unsafe	
	• fall of loose material / chemicals or objects	
	• using equipment to gain height to do work.	
	Risk assessment must ensure: • All work at height is properly planned and appropriately supervised • Those working at height are competent and medically fit. • The place where work at height is done is safe • The risks from fragile surfaces are properly controlled	

	• Equipment for work at height is suitable and properly inspected and maintained • The weather conditions are taken into account and all work is stopped if weather conditions endanger health or safety. • Procedures in case of emergency are planned for	
	Existing structures must be stable, they must support the weight of workers and the equipment or materials they may need. Platforms must be footed on firm ground or on a stable structure to prevent them from moving. For example, scaffolding should generally be tied to an existing structure. Duckboards / crawling ladders should be provided over fragile roofs and light roofs. Where people could fall through holes or openings in a platform floor guard rails, boards or other barriers such as toe boards should be erected. Wherever possible, safety net shall be used to arrest fall from height. For ascending and descending, fall arrest system with grab hook shall be used. Full body safety harness should have two ropes with anchoring hooks and preferably shall be anchored to two independent anchor points. Your risk assessment should help you to choose the most suitable type of equipment to use	
	Reduce the risks of objects falling from height	
	When people are working at height it is essential to consider the risk of objects falling onto somebody or something below.	
	Any hand-held equipment such as drills, saws, buckets can be dropped and knocked over the edge of a platform or walkway. Materials such as nails, pieces of wood and debris can also represent a significant hazard	
	The following must be in place before work starts • Barriers and signs are to be erected. Barriers are to be removed as soon as possible. • Beware of objects falling from above the worksite. Take care not to drop objects when working at height	
	The following Key steps must be observed during to prevent objects falling:	
	• Platforms should be constructed so that materials or objects can't fall and cause injury to anyone or anything below. Close boarded platforms are usually sufficient. • For work over public areas, a double-boarded platform with a polythene sheet in between the boards prevents small items such as nails and bolts from falling.	

	• Toe boards also prevent items from being kicked off the edge of platforms. • Providing a covered walkway is another way to protect people below. • If you're using a cradle, harness or mobile elevated working platform (MEWP), mesh or netting can be used underneath the equipment to prevent anything falling and causing injury or damage. • Covered chutes are an effective and quick method of removing debris from work areas, and much safer than throwing over the side of a platform into a skip below. • Tools such as drills and trowels can be attached to safety lines - if they're accidentally dropped, the line prevents them falling below the work area.	
	• A minimum of two persons is required for this work. • Ensure personnel in surrounding area are warned before the activity starts. • Ladders (when used) to be secured. • Lifting to stop if the load cannot be seen clearly. • Mobile cranes and mobile access towers, to be lowered and secured in transit position when moving. • Only essential work at height to be carried out in darkness. All hazards to be assessed before starting work. • Process equipment is not to be used for hand/foot holds or for supporting lifting gear or scaffolding. • Tools and equipment to be secured to avoid their being dropped. • When work on overhead cables is in progress, no passage underneath the cables is allowed except via approved routes protected by netting slung under the cables. • Work at height in exposed areas is to stop when mean wind speed exceeds 30 kts. • Work at height to stop if there is a possibility of a lightning strike or sand storm	•

Pls refer PTW formats for Attachments 7 & 8 as below title document.

Attachment 7	Hazchem pipeline breaking and equipment opening HIL-PWF-7
Attachment 8	Heavy and Asymmetric Material/Load Lift HIL-PWF-8

Attachment-9

Monitoring, Auditing and Review of the Permit Work System

Monitoring of the system consists of regular checks carried out by supervisors responsible for managing the operation and effectiveness of the Permit to Work System.

Auditing is a systematic examination of the operation and effectiveness of the PTW System. Auditing is performed in accordance with written procedures and checklists and should concentrate on the evaluation of objective evidence.

System Review is an annual examination of the system, carried out after completion of the annual audit of the PTW System. It is to consider audit findings, proposal for change and other relevant information, to assess what changes are required to the system to optimize its effectiveness.

The objectives of Monitoring and Audit of the PTW system are:

a) To establish whether the PTW system is being used as an effective hazard management tool.
b) To check whether the PTW system is meeting it's stated objectives.
c) To provide an opportunity for identifying improvements required to the PTW system and to the audit system itself.
d) To check whether people are complying with system requirements.

The objectives of the System Review are:

a) To review proposals for change to the PTW system to decide whether they should be incorporated.
b) To review audit findings, incident reports and other relevant data to decide whether they indicate a need for improvements to the system.

Auditing of the Permit to Work System

	As part of normal daily duties, the authorized signatories and the area authority should carry out routine monitoring of permits. On a spot check basis they should make checks such as: • Are the relevant hazards correctly identified on the permits? • Are the permits and other associated documents displayed at the worksite? • Has the documentation been completed and authorized correctly? • Is the specified safety equipment in place, in good condition and being used correctly? • Are the specified precautions adequate and being implemented? • Has the work party been briefed on the work, and the requirements of the permit, and have they understood the briefings? **Quarterly Audit** Audits of the PTW system in an audit area are carried out **every 3 months**. Results of the audits should be analysed, and the audit should examine a number of different PTW Activities. Individual Permits may also be audited in detail.	
	Corporate EHS Team PTW System Audit Corporate EHS team shall conduct EHS Audit on the PTW system.	

This Page is kept blank Intentionally for Notes.

SECTION – A5

1.0 SCOPE

This document gives broad guidelines to be followed by the CONTRACTOR for ensuring safe working conditions in and around the site.

2.0 SAFETY ORGANISATION

2.1) Each CONTRACTOR at site shall establish a Safety organization set up at site consisting of qualified safety officers, safety supervisors and stewards as per requirement. Safety officer who shall be responsible for administering safety functions like planning and implementing site inspections, audits, examination / testing, safety surveys, providing supervision, monitoring safe working conditions at all times for their workers. The Safety Officer shall have a degree or diploma in engineering, and diploma in Industrial Safety from recognised central/state government approved institute and also field experience of minimum 03 years in case of degree in engineering or minimum 05 years in case of diploma in engineering, in the relevant discipline. The safety officer shall also have the authority to stop / suspend the unsafe practices and works taken up in unsafe conditions.

2.2) CONTRACTOR shall define the roles and responsibilities of all the personnel at different levels in the safety organization in the CONTRACTOR's Site Safety Plan.

2.3) CONTRACTOR shall take active interest and participate in the development and operation of safety programs at site. His responsibility does not cease with establishment of Safety Group and approval of its various activities. He shall demonstrate his involvement by regular participation in safety meetings, review of safety records and taking corrective action where required, introduction of safety promoting bulletins, posters, suggestions and awards and by setting example by strictly observing safety rules. CONTRACTOR shall remove all waste material and debris from and around the work area and properly clean up the area at the end of each day before leaving the work site.

2.4) CONTRACTOR shall take all necessary precautions not only for safe working of his own workmen but also deploy all precautions to ensure safety of structures, equipment and workmen of other agencies in and around his work site.

2.5) CONTRACTOR shall ensure that his workmen do not trespass into prohibited/restricted work areas.

2.6) EMPLOYER/CONSULTANT shall have the right to inspect at any time, all items of machinery, plant and equipments (owned, borrowed / sub-contracted, leased, rented) brought to site by the CONTRACTOR or his agents or workmen and to prohibit the use on the site of any item, which in the opinion of the EMPLOYER/CONSULTANT is or may be detrimental to the safety of the site. The exercise of such right or the omission to exercise it in any particular case shall not absolve the CONTRACTOR or his agents or workmen of their responsibility of adhering to the safe working practices.

2.7) CONTRACTOR shall execute the work in a manner causing the least possible interference with the business of the EMPLOYER/CONSULTANT, or with the work of any other CONTRACTOR who may be engaged on the premises and shall at all times co-operate with the other CONTRACTORS working at site.

2.8)CONTRACTOR shall obtain daily work permit from the EMPLOYER/CONSULTANT before start of any work at site. The work permits are issued to prevent the CONTRACTOR from working in unauthorised areas and shall be valid for specific area for a stipulated period.

2.9)CONTRACTOR shall ensure at all times that his workers do not lie down or sleep under or around any machine, equipment, vessel or vehicle in his work area at any time.

2.10 RESPONSIBILITIES OF THE CONTRACTOR'S SAFETY OFFICER

The duties of a safety officer shall be to advise and assist the CONTRACTOR's management in the fulfilment of its obligations, statutory or otherwise concerning prevention of personnel injuries and maintaining a safe working environment. These duties shall include the following namely:

a) To advise the building workers in planning and organising measures necessary for effective control of personal injuries.

b) To advise on safety aspects in a construction work and to carry out detailed safety studies of selected activities.

c) To check and evaluate the effectiveness of action taken or proposed to be taken to prevent personal injuries.

d) To advise purchasing and ensuring quality of personal protective equipment confirming to national standards.

e) To carry out safety inspections of construction work in order to observe the physical conditions of work and the work practices and procedures followed by construction workers and to render advise on measures to be adopted for removing unsafe physical conditions and preventing unsafe actions by construction workers.

f) To investigate the near misses, incidents and major accidents and submit the detail report to EMPLOYER/CONSULTANT.

g) To promote the working of safety committees and to act as an advisor to such committees.

h) To design and conduct, either independently or in collaboration with other agencies, suitable training and educational programmes for prevention of accidents to building workers.

i) To frame operational control measures, safe rules and safe working practices in consultation with senior officials of the establishment.

j) Supervise and guide safety precautions to be taken in construction work of the establishment.

k) Ensure compliance to legal and contractual requirements affecting safety, health, and welfare of his workmen.

l) Keeping up-do-date with recommended codes of practice and safety literature. Circulating information applicable to each level of employees.

m) Fostering within the company an understanding that injury prevention and damage control are an integral part of business and operational efficiency.

n) Attending job progress meetings where safety is a point on the agenda. Report on job safety performance.

3.0 Entry and Exit procedures:

3.1) CONTRACTOR must follow Entry / Exit to the project premises for all the project employee and materials will be from the designated entrance / exit point only.

3.2) CONTRACTOR must follow entry / exit systems through Photo ID card / bio-metric.

3.3) CONTRACTOR must follow Entry to the project premises with mandatory PPE's (safety helmet, shoe & reflective jackets).

3.4) The record of Entry / Exit of the personnel will be maintained by the security / time keeper at the gate by CONTRACTOR.

3.5) Vehicles of the CONTRACTORs must be parked only at the designated parking lots in the project premises.

3.6) General Safety awareness posters to be displayed at the entrance and exit gate points by CONTRACTOR.

3.7) CONTRACTOR must provide separate access for pedestrian/vehicles movement at the entry / exit Points.

3.8) ID cards should be displayed by all contract workmen at the entry / exit points.

3.9) CONTRACTOR must provide one full time ambulance and it must be parked near the Entry gate or at the First aid center manned by an experienced driver.

3.10) CONTRACTOR's Plant and Equipments will be screened at the gate before being deployed at site by Employer/Consultant.

3.11) Permission for Entry/Exit of CONTRACTOR's Plant and Equipments into project premises must be through Employer/Consultant.

3.12) The CONTRACTOR shall arrange to separate pedestrian and vehicular (including material handling equipment) traffic wherever possible and maintain the routes clear of obstruction. To ensure safety of users' clear painted demarcation is encouraged as a discipline to be enforced.

4.0 STACKING AND STORAGE PRACTICE

4.1) All construction materials should be stored in designated areas. The CONTRACTOR shall submit a detailed scheme of construction and other hazardous materials' storage, stacking, dispensing and disposal also considering the physical and chemical properties along with the statutory requirements.

4.2) The CONTRACTOR shall ensure stacked material is bonded on a stable and level footing capable of carrying the mass of the stack. Adequate clearances

shall be provided between the sides of the stack and top to facilitate unimpeded access to service equipment like overhead wiring, cranes, forklifts and fire fighting equipment, and hoses. Circular items shall be sufficiently choked with wedges not with odd bits of materials. Free-standing stacks of gunny bags and sacks such as cement bags shall be stacked to prescribed safe-stack heights with layers formed for stable bonding, preventing slippage causing accidents. Stacking against walls shall not be permissible.

4.3) The CONTRACTOR shall maintain the premises and surrounding areas in clean and clear manner with safe access and egress.

5.0 STORAGE OF HAZARDOUS MATERIALS

5.1) CONTRACTOR shall store the Hazardous materials on solid bases. Solid bases shall include compacted earth, pallets, concrete or asphalt platforms or paving. Hazardous materials shall be stored, stacked and secured to prevent toppling, Spillage or other unintended dislodgement. Aisles and clearances shall be detailed as per requirement. Hazardous materials shall be stacked in such a manner that an observer standing in the aisle can read their labels and legend.

5.2) CONTRACTOR must provide each hazardous material contained be identified by a legible or legend as per governing statute, code or regulation. The label shall identify the item, quantity and appropriate warnings.

5.3) Hazardous materials which if brought in contact with each other could react or pose equal or greater hazard than either material stored alone shall be stored at a distance not lesser than twenty feet apart by CONTRACTOR.

5.4) CONTRACTOR shall display/post the Warnings and maintain it in a legible condition at all access points clearly defining the specific hazardous nature of the stored materials such as ‘Explosive’, ‘Compressed Gas’ , ‘Flammable’, ‘Oxidising’, ‘Corrosive’ or other hazardous nature.

5.5) Where hazardous materials are unloaded in the CONTRACTOR's storage maintained at site in a semi-permanent installation, such installations shall be approved by relevant statutory bodies. Copies of licences for storage shall be lodged with the EMPLOYER. The containers and storage shall display quantities stored with name of the hazardous material and the UN hazard classification label in prescribed colour code prominently painted in a conspicuous manner.

5.6) The CONTRACTOR shall inspect the hazardous storages and installations on a daily basis and shall undertake any requisite preventive action necessary to avoid safety risks.

6.0 STORAGE OF FLAMMABLE AND EXPLOSIVE MATERIALS

6.1) CONTRACTOR shall secure flammable and or explosive materials against accidental ignition.

6.2) CONTRACTOR storage facilities for flammable liquids such as petrol, diesel, kerosene and lubricants as well as the quantities stored shall meet the legal and statutory requirements. These shall be stored in approved fire-resistant rooms with a sump of sufficient volume to contain any spillage.

6.3) CONTRACTOR shall provide the electrical fittings with flame proof and follow a strict maintenance schedule. Containers shall be appropriately bonded in receptacles into which low flash point fuel is decanted.

7.0 COMPRESSED GAS CYLINDERS

CONTRACTOR should store the compressed gas cylinders and secure it in the upright position at safe distances shielded from welding and cutting operations/hot work. Compressed gas cylinders in storage shall be shut off and torches, hose and manifolds removed and capped. Cylinders shall be periodically checked for leakages, if any. Compressed gas storages shall be provided with safety relief valves, Safety valves and rupture disc to protect them from overpressures.

8.0 VEHICLES/MACHINERY MOVEMENT IN PROJECT PREMISES

8.1) CONTRACTOR vehicles shall have valid registration , insurance, PUC, and road permit in conformance with regulations and always keep copies of valid travelling documents in the vehicle (Driving license, registration, insurance, and identity card and contact details).

8.2) CONTRACTOR vehicles (Four Wheelers) shall be equipped with seat belts both in front and rear seats, first aid box, portable fire extinguisher, standard stopper (wheel choke), emergency reflective triangles, etc. The drivers should be trained to use fire extinguishers.

8.3) CONTRACTOR vehicles operating on site shall be fitted with reverse horn, rear view mirror and driver shall always be accomplished by trained co-driver / helper.

8.4) CONTRACTOR vehicles shall be well maintained and kept in perfect working order and fully equipped with the proper safety gear. Conduct regular checks of the vehicle's condition and report defects immediately. Any defect has to be

removed as soon as practicable, before the vehicle is put in use. Toeing of vehicle with the help of Hydra or back push from other vehicle is strictly prohibited on site.

8.5) CONTRACTOR shall have driver/operator medical fitness report as per regulation; at least once a year and copy of medical report shall be available with driver/operator.

8.6) CONTRACTOR drivers shall have an experience of minimum 5 years and age should be between 25 and 58 years (holding Heavy vehicle license).

8.7) All employees including CONTRACTOR shall wear crash helmet and shoes while driving motorbike. Safety helmets provided for project / site work shall not be worn as crashed helmets, as they are not adequate to withstand the impact caused during accident of vehicle (two-wheeler). Two wheel drivers shall use adequate crash helmets of approved ISI mark.

8.8) Any new CONTRACTOR driver before starting driving shall attend authorized training program for safe driving as per regulation.

8.9) CONTRACTOR drivers shall have his journey schedule showing expected date and time to complete the journey.

8.10) CONTRACTOR drivers shall ensure to take minimum 15 minutes rest for every 4 hrs of continuous journey. Also shall not drive more than 12 hrs in a day.

8.11) CONTRACTOR drivers shall operate only those vehicles for which they are trained, authorized and licensed.

8.12) Without proper authorization by EMPLOYER/CONSULTANT CONTRACTOR respective drivers/operators shall not operate any vehicle other than they are authorized to operate, even if they are capable of such operation.

8.13) CONTRACTOR shall ensure that the person in the driver's seat as well as others in the vehicle shall keep seat belts fastened, while the vehicle is in motion.

8.14) CONTRACTOR shall specify and safe speed limits to be observed and maintained at all times.

8.15) CONTRACTOR must specify vehicle operating instructions.

8.16) CONTRACTOR must ensure safe driving during bad weather conditions (rain showers, winds, snow, etc.) with utmost care.

8.17) CONTRACTOR must ensure that, mobile phones are not to be used whilst driving or operating a vehicle.

8.18) CONTRACTOR must display that Driving under the influence of alcohol or any sedative drug (including prescribed medication) is strictly prohibited.

8.19) CONTRACTOR shall ensure that eating, drinking (even non-alcoholic beverages), etc. during driving inside the project premises be avoided. Such activities increase the risk of accident due to distraction and lack of concentration.

8.20) When loading and unloading, the CONTRACTOR shall observe relevant guidelines and requirements to avoid danger to any person or damage to any property.

8.21) Drivers/Operators shall not attend to mobile calls/listen to music while driving the vehicles/machinery.

9.0 Excavation

9.1) As built drawings of underground services must be referred by the CONTRACTOR before starting the excavation activity.

9.2) CONTRACTOR should make detail excavation methodology and submit the Methodology for approval to EMPLOYER/CONSULTANT.

9.3) CONTRACTOR must ensure the stability of structure adjoining the workplace or other areas to be excavated by providing safety measures like Sheet piling, shoring or other similar means to support structure.

9.4) CONTRACTOR should provide a safe access by providing ladders, staircase or ramps.

9.5) CONTRACTOR should ensure at a construction site that any machinery used in excavation is positioned and operated in such a way that such machinery does not endanger the operator of such machinery.

9.6) In the event of an excavation or removing a manhole cover, the CONTRACTOR should ensure that any opening, sump or pit caused is securely fenced and covered before leaving the workplace for the day.

9.7) Hard barricading should be provided around excavation area by CONTRACTOR.

9.8) Excavated earth must be placed 2m away from the excavated area and Suitable warning boards and signs should be put up by CONTRACTOR near excavation work area.

10.0 Scaffolds

10.1) Before erecting scaffold at site, CONTRACTOR has to get approved the scaffold design/drawings from EMPLOYER / CONSULTANT.

10.2) Scaffold materials must be as per IS standard.

10.3) Competent person must be involved in scaffold erection.

10.4) CONTRACTOR must use Mandatory scaffold components Base plate, ladders, Steel platform (tied with the scaffold), mid rail, Hand rail, Toe board (150 MM), bracings while erecting the scaffold.

10.5) EMPLOYER/CONSULTANT will inspect the CONTRACTOR scaffolding whether erected scaffold is as per the approved design.

10.6) SCAFF tag must be followed (Red Tag- Unsafe/Not to use, Green Tag – Safe to use).

10.7) CONTRACTOR must ensure usage of mobile scaffold is strictly prohibited.

10.8) CONTRACTOR must provide the scaffold with proper fall protection system intact and display the suitable warning boards.

10.9)CONTRACTOR must ensure area to be barricaded during erection and dismantling of scaffolds.

11.0 WORKING AT HEIGHTS

11.1) CONTRACTOR workmen engaged must undergo medical fitness examination before deploying them for work at heights.

11.2) CONTRACTOR workers should wear safety full body harness with double lanyard with hook properly fastened.

11.3) CONTRACTOR workmen engaged on work at heights should be experienced in such work.

11.4) Steel scaffold staging should be erected as per IS code and the design for Scaffold staging must be submitted to EMPLOYER/CONSULTANT for approval.

11.5) Wherever multiple work activities CONTRACTOR must use safety nets beneath the place of work for safety.

11.6) CONTRACTOR when working over equipments or tanks, Full body safety harness with double lanyard, safety lifeline and safety nets should always be used whether or not staging and scaffolding is provided.

11.7) Safe access to all points of works should be provided in the form of Suitable Ladders /stairways/ boom lifts by CONTRACTOR.

11.8) Area around the work place should be barricaded suitably or fenced off to avoid Injuries to personnel passing by. Suitable warning boards and sign should be put up by CONTRACTOR.

11.9) Life line and fall protection arrangements should be provided for working at heights by CONTRACTOR

11.10) CONTRACTOR must ensure loose materials should be cleared on daily basis from scaffolds.

11.11) Man-basket not permitted for height works.

12 Hot Work (Welding / Gas cutting work)

12.1) Only qualified welders should be employed at the work site. The CONTRACTOR should organise the qualifying test at site for his welders and the EMPLOYER / CONSULTANT should approve the welders. All welders should have to undergo qualifying test and only on passing the test, they should be allowed to work at site.

12.2) CONTRACTOR must organise for all welding work at site, Rectifier / Thyristor sets instead of AC transformer sets. AC transformer sets are banned for welding jobs (both open and closed top type).

12.3) CONTRACTOR should get his welding sets certified by the EMPLOYER/CONSULTANT before start of the work. These certificates should have to be renewed every month. A copy of the certificates should be displayed on respective welding sets.

12.4) Only cables in good condition and insulated holders should be used. The length of supply cable to welding site should not exceed 8 metres and the welding set body should be properly earthed.

12.5) CONTRACTOR welder should not use a building structure, pipeline or railway track etc. as a return path of the current. Adequately rated circuit breaker should be provided in the power circuit for human protection on all power supply points.

12.6) Before starting any Hot work like Gas cutting, welding and grinding etc., the CONTRACTOR should obtain hot work permit from the EMPLOYER/CONSULTANT. The permit should be renewed on day-to-day basis.

12.7) CONTRACTOR should ensure purging of piping and equipment to make it totally safe before carrying out any hot work.

12.8) No combustible material should be stored on or near any source of heat like hot pipes, welding or gas. Before leaving the place of work or the CONTRACTOR's sheds, the CONTRACTOR's workmen should ensure that no material or item that could start a fire is left at site. Special attention should be paid to collection and disposal of oil soaked cotton waste or rags. On no account are these to be dropped into corners, pushed below equipment or left hanging on pipes.

12.9) CONTRACTOR must use gas cylinders in a safe manner. These should not be dropped from heights or dragged on the floor. Trolley with rubber rimmed wheels should be used for transporting gas cylinders within the site. All cylinders should be kept in upright position. Oxygen cylinders should not be kept near inflammable materials like oil etc.

12.10) Standard colour codes for the cylinder must be followed (Oxygen-Black, Acetylene-Maroon) by CONTRACTOR.

12.11) CONTRACTOR must provide the gas cutting sets with flash back arrestor at both ends (Cylinder and Torch) and gas cutting rubber tube ends fixed with the clamps.

12.12) CONTRACTOR must provide the fire blankets for fire protection and not tarpaulins in the vicinity of welding and gas cutting jobs.

12.13) CONTRACTOR must provide charged fire extinguisher of DCP / CO2 type with each welding/gas cutting set.

12.14) LPG shall not be used for cutting / heat treatment purpose (strictly prohibited).

13 ERECTION, LIFTING APPLIANCE AND GEAR

13.1) CONTRACTOR shall submit detail erection methodology and shall get the same approved by EMPLOYER / CONSULTANT.

13.2) CONTRACTOR shall mobilize the lifting appliance and gear in good working condition.

13.3) CONTRACTOR shall submit a valid Test Certificate to the EMPLOYER / CONSULTANT, from approved certifying authorities for all of his lifting gear and hoists, slings, chains, wire ropes, hooks, chain-pulley blocks, winches, hoists and cranes etc. before commencing work.

13.4) These third party test shall be carried out at site by the CONTRACTOR

13.5)These certificates shall be available at site in the CONTRACTOR office for Inspection as and when required.

13.6) Full time mechanic shall be deployed to maintain all the lifting appliance and gear at site.

14 CLEANLINESS

CONTRACTOR must ensure cleanliness as an integral part of plant / project site outlook; the main obstacle to cleanliness in concrete batching plants, hot mix plants, grout mix plants, crushing plants, mine works, is the emission of fugitive dust. This must be fought by special care taken of the following:

a) Material unloading & handling systems
b) Equipments and workshops
c) Unloading / Storage / handling of the materials
d) Road systems.

It must be emphasized that the proper design and sizing of dust removal / extraction equipments is of utmost importance to ensure cleanliness; adequate & special care while designing & selection of machinery to be taken in the following dust prone areas:

a) Cement Bag packing area.
b) Cement Truck loading area.

c) Adequate sizing of all dust preventing, dust collecting and dust suppression / recovery devices.
d) Proper design, positioning, use and maintenance of dust control equipment.
e) Proper design, positioning and maintenance of storage bins like silos, bunkers, screw conveyors etc.

15 MATERIAL HANDLING SYSTEMS

CONTRACTOR shall have Material handling systems such as loading and unloading areas, conveyor belts and transfer points used to handle materials as raw meal, additives, solid fuels, clinker, and cement, these be equipped with dust removal devices. While designing the conveyor systems CONTRACTOR must take special care to minimize transfer points & provide dust suppression to control fugitive emission.

16 EQUIPMENT AND WORKSHOP

CONTRACTOR shall ensure that all dusty work areas such as cement bagging, truck/wagon loading, mixing or weigh hopper landing must be properly ventilated and filtered adequate care of dust suppression to be taken while designing.

Also important to allow for cleaning away dust produced by various types of equipment if they breakdown or are taken apart. This capacity of cleaning must be included in equipment design and selection criteria. It must also be accounted for when designing work-areas.

17 STORAGE OF FINE MATERIALS

CONTRACTOR should ensure that fine materials stored in silos, must be equipped with adequate dust filtering equipment. Storage of fine materials in the open air or open buildings is only accepted at exceptional locations. These storage zones must be protected from the dominant winds either by strategic positioning or through artificial protection (walls, barns). Areas where fine materials are stored in the open must be equipped or designed in such a way that potential runoff from rain/storm water does not contaminate the environment; this means that runoff waters must be collected and settled before release to off-site receiving bodies.

18 SCRAP AND REFUSE BINS-REMOVAL SYSTEM

The CONTRACTOR shall ensure that he has sufficient waste bins that are identified for different wastes and maintained in clearly demarcated areas. Wastes with oily or other ignitable materials such as oily cotton wastes and hand gloves shall be stored separately with covers to prevent fires and shall be made of metal. Different wastes shall be segregated and stored separately and disposed off. These shall be emptied at routine intervals to prevent that they do not overflow with wastes.

18.1) Solid Waste Management

The CONTRACTOR shall ensure that he has sufficient waste collection bins categorised as hazardous and non-hazardous waste with specific names. Non-hazardous waste shall be disposed in environment friendly manner. CONTRACTOR shall maintain adequate records of hazardous waste disposed.

The waste collection bins should be covered properly.

18.2) Vehicle Wash bay

The CONTRACTOR shall establish a wash bay near each entrance to the project site. All trucks/vehicles moving outside the site shall have the tyres washed prior to the site leaving the project site. This is to ensure that the roads outside the site are not dirtied / defaced by construction muck. The wash bays shall have submersible pump (1+1 backup) and a hose jet along with recyclable water for washing tyres. Dedicated workers would be manning the wash back at each time. Dump trucks to have lift covers on top to prevent muck/dirt/smell from flowing across roads.

18.3) Sedimentation tank

The CONTRACTOR shall establish that the trade effluent generated as a result of maintenance of concrete batch mixing plant / grout mix plant or washing any residuals of tests conducted on concrete, be properly routed to a designed and approved sedimentation tank. The CONTRACTOR shall also periodically monitor and ensure the compliance to acceptable limits of the vital parameters of the treated water like pH, oil and chemical contents, BOD, COD, TDS, Turbidity etc or as prescribed under the conditions of consent to operate the plant before discharging.

19 PROTECTION OF WATER

Both surface water and underground water resources must be protected from all possible pollution be it chronic or accidental.

20 NOISE REDUCTION

CONTRACTOR must ensure noise does not represent a nuisance to neighbours, all measures must be taken to reduce emission of noise from equipment (crushers and/or grinders must be enclosed, as well as compressors, diesel generators; care must be taken in selection of low-noise blowers). Noise reducing devices / acoustical enclosures must be installed systematically on the noisiest equipment. CONTRACTOR must follow the statutory legislation for noise levels. Timely preventive and break-down maintenance of the equipment and machinery shall be carried out by CONTRACTOR in order to reduce the noise generation.

21 WASTE MINIMIZATION

CONTRACTOR must avoid or minimize production of waste with an objective to aim towards zero-waste. Production facility must be provided with all the necessary equipment to manage its wastes; storage, sorting, cleaning, pre-processing, and recycling. Temporary waste storage facilities should be designed in such a way as to control emissions to the atmosphere (volatile organics, fugitive dust) and to protect surface and underground water.

22 ASBESTOS

22.1) Use of asbestos under any form is strictly forbidden in all construction activities and facilities.

22.2) Only CONTRACTOR trained in removal of asbestos should be eligible for asbestos removal. All removal work should be managed and approved by the EMPLOYER / CONSULTANT.

SECTION – A6

6.0 SAFETY ORGANISATION

6.1 SAFETY POLICY

The contractor shall at all times comply with Owner's Hearth and Safety Policy while performing the works. In addition, the Contract Organisation shall have a written health and safety policy issued by the Chief Executive of the Organisation, appropriate to the scale and nature of the risks involved in the contract works. A copy of the Policy shall be made available to the OWNER before signing the contract agreement as evidence of CONTRACTOR's commitment to management of employee's health and safety and compliance to Statutory and regulatory requirements. The Policy along with its Component operation procedures shall be evidenced as working document publicised among CONTRACTOR's and his Sub-contractors' employees through appropriate language/s. All CONTRACTOR's employees shall be familiar with the Safety Policy and their role and obligations in its implementation. The Policy shall meet the relevant statutory and regulatory requirements and the requirements of the OWNER. The Policy shall periodically be reviewed for updating with respect to new and emerging legal, statutory and other requirements.

6.2 SAFETY REPRESENTATIVE

a) CONTRACTOR shall appoint a Safety Representative (SR) meeting statutory competence requirement, with a minimum experience of 10 to 15 years of safety management in comparable contracts, approved by the OWNER on the basis of his qualification and experience. The SR shall give his whole time to the superintendence of the Health and Safety Programme of the CONTRACTOR.

b) The CONTRACTOR shall also nominate in writing competent Safety Appointees from different disciplines to assist SR in implementation of health and safety measures in their routine contract works. The SR shall have sufficient authority to direct CONTRACTOR's or his Subcontractor's personnel to meet health and safety requirements and to stop performance of work until such requirements are met.

6.3 Employee Consultations, Safety Committee And Communication

a) CONTRACTOR shall ensure full involvement of all his employees recognising their right to consultation on health and safety matters. The safety appointees of the various areas, in conjunction with the SR shall be responsible for ensuring employees' involvement through routine safety inspections, hazard and risk assessment in new and changed works and their control. CONTRACTOR shall maintain appropriate operating procedures to guide these requirements.

b) The CONTRACTOR shall also appoint a Safety Committee (SC) comprising of Safety Appointees from the various areas under the chairmanship of the SR. The committee shall meet at periodic intervals of at least once in a month to discuss the status and adequacy of the safety management, and any safety concerns of the employees. The committee shall also formulate and validate the safety procedures incorporating controls to prevent or mitigate hazards and risks before submission for approval by OWNER /ENGINEER. The minutes of SC meeting shall be submitted to the OWNER /ENGINEER. SR shall maintain the records of the meetings.

c) CONTRACTOR shall communicate to the employees regularly on job hazards applicable to their tasks in hand. Safety Appointees (SA's or any of SR's nominees.) shall hold 'Toolbox talks' for this purpose on a routine basis before undertaking any safety critical and /or non-routine activities. Weekly meetings of the CONTRACTOR and his Subcontractor attended by the SR and SA's shall include safety as a key item in the agenda to discuss hazards and risk assessments, Job safety analysis, and control procedures and to review accidents and incidents (Near-miss) for remedial measures to prevent such occurrence. The minutes of the meeting shall be submitted to the to the OWNER / ENGINEER. SR shall maintain the records.

6.4 CONTRACTOR's safety reports

The CONTRACTOR shall submit a monthly written report to the OWNER / ENGINEER, which shall be due on the fifth working day of every month. The health and safety of all full time, part-time, permanent temporary, contract employees and any outsourced employee undertaking any part of the contract-works shall be included in the safety report. The report shall include the total number of working hours for the month, the number of recordable accidents and the number of lost-time accidents. A cumulative trend plot of the monthly severity and frequency rate of the reportable accidents shall be included in the monthly safety report and calculated as:

$$\textbf{SEVERITY} = \frac{\text{LOST MANDAYS DUE TO LOSS-TIME INJURIES X 1000000}}{\text{MANHOURS WORKED}}$$

$$\textbf{FREQUENCY} = \frac{\text{NUMBER OF LOST TIME INJURY X 1000000}}{\text{MANHOURS WORKED}}$$

CONTRACTOR shall arrange to display the safety statistics and the cumulative plot of severity and frequency of accidents mentioned above painted in a safety board, which shall be prominently displayed, as a means of encouragement and assurance to all interested parties and for publicising the safety achievements.

6.5 CONTRACTOR's accident/incident reports

"Accident" for the purpose of this clause is defined as "Undesired event giving rise to death, ill-health, injury, damage or other loss" and "Incident" is defined as “Event that gave rise to an accident or had the potential to lead to an accident”. An accident where no ill health, injury, damage or other loss occurs also referred to as "near-miss". Incident includes near miss.

The CONTRACTOR shall report orally to OWNER regardless of their extent, duration and severity, immediately on occurrence of all accidents resulting in:

a) personal injury (First aid cases, minor /major accident)

b) property damages,

c) Fires,

d) spills and

e) near-misses / Dangerous occurrence.

f) Unsafe act and unsafe conditions in the area of work.

CONTRACTOR shall submit the accident/ incident report in writing to OWNER / ENGINEER within 24 hours of its happening in the form as prescribed by the governing statute or in the absence of which, in the form prescribed by the OWNER /ENGINEER. CONTRACTOR shall detail in the Accident/Incident report, the particulars of the dangerous occurrence leading to the accident, lost time of absence due to accident, root cause analysis and the corrective and preventive actions to prevent such recurrence. In addition, CONTRACTOR shall include his estimate of the impact of accident on project schedule. Incidents shall also be reported in the same manner identifying root cause/s to eliminate such potential occurrence or risks

6.6 First - Aid Personnel and Facilities

a) The CONTRACTOR shall make available first-aiders, first-aid boxes and or first aid stations as per statutory requirements. The persons holding current certificates of competency of recognised institutions in prescribed numbers as per any governing statute and in the absence of such regulatory requirement a minimum of one first-aider for each area of work for every hundred workmen. First-aiders' names shall be prominently displayed.

b) The first -aid boxes shall display contents of medical and medicinal articles with quantity maintained, which shall be in accordance with governing statute. Nominated first-aider shall replenish stock promptly.

The first-aid refresher training shall be provided at least once in a year and all employees shall be encouraged to undergo first-aid training. A record shall be kept of all first aid treatments with particulars of treatment and personnel providing the treatment.

6.7 Occupational Health Centre

a) Where required by the Contract, CONTRACTOR shall establish and maintain an occupational Health centre where hazardous Processes are involved such as Roof work, Steel work, working above or below water Demolition and Confined space. Where OWNER maintains the Occupational Health centre facilitating the CONTRACTOR, such a facility shall meet the requirements laid by the governing statute and this shall be stated in the Contract. Where the CONTRACTOR outsources such facility, it shall meet the statutory requirements and shall be approved by the OWNER and the statutory body.

b) The occupational Health facility shall be served by a full-time medical officer holding a medical degree in allopathic medicine with a minimum of five years experience in Occupational health/ medicine. A Nurse, One dresser / Compounder and one sweeper cum Ward boy who will all be available during entire construction operations during the day shall assist the medical officer.

c) The Occupational Health Centre shall be capable of undertaking Emergency care services or Emergency treatment facilities which shall include emergency life saving aids and appliances to handle Head and spinal injuries, severe fractures, snake bites, burns of all nature, Electric shocks, cases of asphyxiation and such other severe injuries as could be reasonably anticipated and the facilities shall meet provisions of any governing statute.

6.8 Ambulance Room and Ambulance Vans

OWNER shall arrange for an ambulance room and an ambulance van directly or outsource the facilities meeting the governing statutory needs for prompt transportation of serious cases accident and or sickness to the Hospital. Such facilities shall be maintained in good condition and equipped with facilities such as dry powder

type extinguishers, flashlights Portable Oxygen Unit, self-contained breathing apparatus etc as prescribed by the governing statute.

6.9 Induction and job-safety training

a) CONTRACTOR shall maintain a procedure for identification of the training needs and training his employees to create a health and safety conscious work-force that will comply with the law and safety requirements of the Organisation. He shall also maintain a procedure for safety induction and initial training as well as follow-up training on the job safety for new entrants. All employees shall receive effective training and periodic refresher training on the operation control procedures specific to their tasks designed to control the job-safety risks. A booklet of such operation control procedures and safety rules with need based pictorial illustrations shall be made available to all employees who are to learn and be familiar with such procedures. All training shall be monitored for effectiveness as per established procedures. CONTRACTOR shall maintain records of all training.

b) Safety Representative and Safety Appointees shall conduct regular fortnightly or weekly mock-safety drills for different imaginary accident scenarios, in premeditated work areas to provide on-job training such as:

i use of safety appliances such as water monitors, hydrants, hydrant pumps, fire-hoses, extinguishers, breathing apparatus and safety harness for working at height,

ii response to health & safety emergencies,

iii fighting fires using different equipment and

iv first aid

Participants shall receive training during mock-drills through role-play of their normal expected tasks during emergencies and firefighting. The degree of demonstrated ability in the chosen tasks during such safety drills shall be recorded as participants' competence level for planning his further training. The experience gained in mock drills shall be used to update of operational control procedures and the training needs. The roster of participants and contents for routine mock-drills shall be appropriately planned to cover all employees in the training at least once in four months.

c) The Safety Representative and Safety Appointees shall be trained on a standardised comprehensive advanced training programme covering safety management, legal aspects, techniques of hazard identification and risk assessment and specific job-safety in various disciplines such as Civil, Electrical, Instrumentation and Mechanical plant and equipment of the CONTRACTOR. The training records shall be maintained subject to audit by OWNER /ENGINEER. Training effectiveness shall be assessed and recorded and used as input for further training plans of the employee.

6.10 Health and Safety Promotion

Safety posters, banners and slogans displayed for safety promotion shall be rotated at frequent intervals. The CONTRACTOR is encouraged to have safety promotion as an item in the safety committee agenda. CONTRACTOR is encouraged to include safety promotion programmes such as: safety bulletins, magazines, competitions in slogan and poetry writing on safety, screening of safety films, celebration of national safety and environmental day, safety suggestion schemes and safety library etc.

6.11 Purchase and Procurement Control

a) The CONTRACTOR shall maintain a procedure for control of his purchases to ensure that all safety requirements are appropriately vetted by the safety personnel during all stages of procurement including planning of specifications, inspection for acceptance and commissioning in order that threats to safety are not overlooked and appropriate attention is paid to the training of personnel in the operation of CONTRACTOR's new or changed machinery and their operation control procedures, to prevent / control risks.

b) CONTRACTOR shall exercise due diligence in appointing his subcontractors and outsourcing contract services, that no new health and safety threats are created. CONTRACTOR shall ensure personnel of subcontractors and outsourced contract services are competent in health and safety management to meet the Policy requirements. They shall be made aware of the safety rules, emergency procedures and any information that will have a bearing on the safety, health and related contractual obligations.

6.12 Hazard Identification and Risk Assessment

a) CONTRACTOR shall ensure that his key personnel and safety personnel are trained to be competent in hazard identification, risk assessment and risk control processes. CONTRACTOR shall on a routine basis identify, evaluate and control all health and safety risks especially in the hazardous work activities and also to validate the previous risk assessments. Elements such as hazard identification, evaluation of risks with existing control measures in place and estimate of tolerability of the residual risks shall be an ongoing process. Any additional/New control measures shall be designed based on this process on need basis.

b) CONTRACTOR shall maintain a Hazard Identification, Risk Analysis and Risk Control Manual(HIRARC) pertaining to all his activities duly updated as detailed above. The HIRARC manual shall be made available to the OWNER /ENGINEER during regular inspections and audits.

6.13 Work Permits

The CONTRACTOR shall maintain a work permit procedure to limit the hazardous processes and high risks tasks to authorised personnel, who shall be informed of the job safety analysis and the job specific safety precautions, on issue of a work-permit. The work permit issued under the procedure shall be valid for a specified period and shall be issued only after all safety precautions are fulfilled and duly verified by SR/SA or specialists who are authorised for safety certification as a prerequisite for issue of a work permit. The work permit shall be appropriate for the purpose for which it is issued. The different work-permits are:

a) A Safety Work Permit (SWP)

SWP is mandatory for working in heights, on fragile roofs such as Asbestos or such roofing works, Steel structural Erection, Work over water, a live substation or switch-yard even if section of work is not electrically charged, Demolition, Blasting and such potentially hazardous Contract works in the opinion of the ENGINEER / OWNER.

b) Hot-Work Permits (HWP)

HWP shall be used where hot working (like electric or gas welding, gas cutting, or burning or any other operation involving heating, open flames or electric arcs,

grinding and electrical works etc) is potentially dangerous in areas such as inflammable materials storage, plant and pipe lines handling inflammable and or explosive materials either presently or in the past, or where new works are undertaken adjoining such works which in the opinion of the OWNER /ENGINEER are potential risks. A **HWP** shall be deemed mandatory in all such potentially dangerous areas. CONTRACTOR shall get areas such as Welding shops or maintenance areas approved by OWNER / ENGINEER for 'Permit-Free 'Operation.

c) Confined Space Entry Permit (CSP)

CSP is issued for entering and carrying out tasks in confined space. Confined Space for the purpose of this clause is defined as an enclosed or partially enclosed space which is not intended or designed primarily as a work place and

i. is at atmospheric pressure during occupancy.

ii. has restricted entry and exit.

iii. has potentially harmful levels of toxic or inflammable contaminant or unsafe levels of oxygen.

iv. is of a nature that could contribute to overwhelming a person by an unsafe atmosphere.

v. has a potential that safety on entry could be affected by unsafe conditions stated above by accident or due to human errors.

vi. Confined spaces shall include but not limited to: storage tanks, Process vessels, Bins, Boilers, ventilation or exhaust ducts, Sewers, Underground Utility vaults, Tunnels, Pipelines and open top spaces more than 4 feet in depth such as pits, tubs, vaults and vessels.

d) Electrical Safety permits/Lock-out and tag out (ESP: LOTO)

CONTRACTOR shall institute an electrical safety permit system to ensure safe electrical isolation. Safety permits shall not be issued until safe release tag is placed on the equipment isolated on all isolating points. The safety permit shall be returned on satisfactory completion of the job by the executing agencies duly signing off indicating that all shorts and grounds and men and materials are removed from the job and that the job safe for energising. This is a prerequisite to energise the isolated equipment. The safety tags shall be collected in the order first the isolated equipment and lastly the tag on the main control of the equipment The tags and permit system shall be auditable.

6.14 Job Safety Inspection

The CONTRACTOR shall maintain a procedure for Safety Inspection at routine intervals to provide assurance that the instituted safety procedures are in place to prevent deviations from established standards that could lead to a safety hazard and consequential risk. The CONTRACTOR shall establish appropriate standardised checklists. for systematic job safety verification to ensure :

a) set standards are followed without deviation,

b) employees are competent to perform as per prescribed operation control procedures,

c) monitoring of safety of the various work areas/tasks and

d) adequacy of existing operation control procedures and practices to mitigate and eliminate risks.

Should the existing operation control procedures prove inadequate and the residual risks are higher than tolerable levels, SR shall initiate hazard and risk assessment/analysis and consultations with Safety Committee to deploy appropriate remedial measures and improved operation control procedures. Periodic inspection reports and proposed remedial measures shall be submitted to OWNER. Records of changes in control procedures consultations with Safety Committee and revision of Operational controls shall all constitute objective evidence of the existence of established procedures.

6.15 Safety Audits

a) CONTRACTOR shall undertake periodic safety audits to confirm through investigative methods the effectiveness of the measures set out in the Safety Policy. In order to be effective such safety audit shall be comprehensively covering all aspects detailed in this specification to ensure effective Loss-control / accident prevention programme. Safety audits shall take into account the safety inspection records, remedial measures and effectiveness of the safety programme. Effectiveness of safety Programme shall be based on CONTRACTOR's effective Hazard identification and risk assessment processes for design of Operation control procedures and on the safety statistics. Audit reports and preventive actions and Safety Improvement programmes shall be submitted to OWNER.

b) OWNER shall retain his right to audit CONTRACTOR's Safety management System either directly by his Employees or his nominated representatives for its effectiveness.

6.16 EQUIPMENT AND SUBSTANCES AND PERSONAL SAFEGUARDING

6.16.1 Mechanical Safety:

a) CONTRACTOR shall ensure that all his equipment and machinery are safe to use while in motion or working. Operators shall have received training or instruction on operation of the machinery and the regulatory requirements. CONTRACTOR shall have adequate procedure to ensure the stability and securing of his working machinery during operation. He shall restrict repair and maintenance of the machinery to trained personnel and maintain records of repairs and maintenance. The equipment shall have appropriately designed means of isolating from sources of energy and shall have emergency stop control, which is easily accessible. All controls shall be clearly and uniformly marked. All operation controls, interlocks, sensing devices and guards on tools and equipment shall be functional and their status shall be regularly checked and recorded. CONTRACTOR shall provide evidence of compliance to these requirements in any contractual write-ups submitted to OWNER /ENGINEER for approval in respect of critical construction/ contract works.

b) CONTRACTOR shall provide only good quality hand tools and ensure control of condition, storage, routine inspection and use of such hand-tools. Unsafe tools such as with cracked or broken handles, mushroomed chisels and punches, worn screwdrivers, hardened hammerheads; power tools with unsafe resistance to earth or without safety guards shall be prohibited.

c) All safety ladders and scaffolding and such access equipment shall meet requirements of IS 3696: and IS 4014:1967 and such standards ENGINEER/

OWNER may stipulate. The safety work permits shall be issued only after ensuring that all safety requirements of access equipment are complied with. Access equipment shall be inspected on a routine basis to prevent injuries caused by falls.

d) CONTRACTOR shall ensure safety of all those concerned with lifting and those who may be affected by material hoisting, lifting and handling using various mechanical aids. All lifting equipment such as cranes, hoists, lifting shackles, hooks chains and links shall be designed as per appropriate International codes of construction. Operators shall have been trained in operation and maintenance of such equipment besides training on standard hand signals to be employed during the hoisting and lifting operations. Safe working loads shall be marked on equipment prominently. SWL shall be evidenced to have been established by test procedures in accordance with acceptable codes of practices.

e) Riding on construction equipment, forklifts and cranes shall be prohibited unless such vehicles are provided with passenger seats.

f) Pressurised gas and air systems shall be maintained safe in good working order and shall meet the requirements of the Factories Act 1948,The Static and Mobile Pressure Vessels Rules 1984 and the Gas Cylinder Rules 1934 as applicable. The safety relief valves, safety appurtenances and isolation systems shall be compliant with safety code of practices. Any statutory register of pressure vessel records and the code of practices shall be subject to periodic auditing by OWNER and ENGINEER.

g) The areas of highly dangerous activities like hoisting, lifting and rock blasting, and radiation, shall be appropriately barricaded to protect personnel and machinery and guided by work permit discipline. Emergency plans shall cater to emergencies arising out of such activities.

h) Signs, barricades, barrier tapes and warning or entry restriction devices or accessories shall be provided to minimise work related risks of accidents and injuries. Signage shall meet all regulatory requirements such as under The Building and other construction workers Act 1996, Factory Act 1948, Manufacture, Storage, Import of Hazardous Chemicals Rules under Environmental Protection Act 1986,Indian Explosives Act 1984 and Gas Cylinder Rules1981 and Indian Electricity Act 1910 and Rules there of and any other safety requirements of OWNER and ENGINEER.

6.16.2 Electrical Equipment-Safety

a) CONTRACTOR shall provide only such equipment for work that is electrically safe to work. CONTRACTOR shall have a procedure to identify and record all his electrical equipment in a register, with provisions to record his periodic inspections of such equipment. Inspection shall cover cables, extension leads, all electrical equipment drawing power from socket outlet. He shall identify and maintain in good working order all electrical installations such as distribution panels and major switchgear ensuring safe accessibility. A clear area shall be maintained around Panels and switchgears. The installed equipment shall be periodically inspected by qualified personnel to ensure their continued safe operating condition. Inspection shall include earth polarity checks, continuity checks and earth resistance checks. CONTRACTOR shall ensure use of flameproof and explosion proof switchgears and lighting fittings where required as per governing codes.

b) Approved earth leakage relays or alternative safety devices to relevant IS/International codes shall be used on all portable electrical hand tools. Where

possible low-voltage electric power supply shall be used for hand tools, earth leakage units shall protect electrical installations in workshops, kitchens, cafeterias, first-aid rooms, laboratories and Offices. Record of regular checks shall be maintained. CONTRACTOR shall comply with "Code of practice for earthing" as per IS 3043:1987.

c) Safety rubber matting of appropriate voltage rating conforming to IS 5424:1969 titled "Rubber mats for electrical purposes" shall be provided in front of all switchgears and power distribution panels for the safety of personnel operating such equipment

d) CONTRACTOR shall arrange displaying signages under Indian Electricity Act 1910, such as :

i Danger notices as per IS 2551 in conspicuous places on all low, medium and High voltages as per Rule 35,

ii Instruction of restoration of persons suffering from electric shock in English and local languages as per Rule 44 in switch gear rooms, substations and places where electricity is used and

iii Notice prohibiting unauthorised entry in areas where electrical apparatus are used.

e) All power cables providing construction power to various construction machinery and the connectors shall be in safe and sound condition. Cables shall be routed through cable trays supported on appropriately designed structures, duly clamped, secured and identified. Road crossing cables shall be laid in conduits buried at least 600 mm. below the surface to prevent damage due to vehicular traffic. All cables shall be off the floor to avoid damage or tripping hazard. Cables shall be terminated at the switchgears and sockets in a workman like manner to prevent loose contacts and flashover. Only safety receptacles shall be used for providing power connection to hand-tools. All switches and distribution boards shall be clearly marked. All electrical distribution and panel wiring diagrams shall be available with the electrical maintenance personnel. CONTRACTOR shall maintain a safe electrical isolation/lockout procedure.

f) CONTRACTOR shall ensure lighting circuits are not used for hand-tools. No electrical equipment shall be overloaded. Tools and test equipment used on electrical systems shall be insulated.

6.16.3 Substances Abuse Plan

The CONTRACTOR is encouraged to have a "substance abuse programme", and pre-employment drug testing. Drinking during working hours shall be strictly prohibited. CONTRACTOR shall promote through poster and other publicity, awareness on abuse of substances such as alcohol and such depressant drugs that slows the activity of brain and spinal cord on abusive usage endangering the safety and health of users and others affected by their work.

6.16.4 Hazardous Substances Control

a) CONTRACTOR shall prevent all injuries, illnesses and damage to property or the environment caused by any article or substance, which proves to be hazardous. The code of practices of construction and operation and maintenance and control procedures shall meet required statutory and regulatory requirements. Personnel shall be trained on use, handling, storage and disposal of and emergency spillage procedures.

b) CONTRACTOR shall detail and deploy Operational controls to reduce hazardous wastes and their disposal as required by the statute " Hazardous Waste (Management and handling) Rules 2000". Oil wastes, used oils, soil and cotton soaked in oil consequent to handling operations, grease and many class of paints and asbestos sheets and gaskets are typical hazardous wastes.

c) CONTRACTOR shall identify, contain and control all sources of radiation. Appropriate regulatory approvals shall be obtained before commencement of work involving radiation sources. Radiation protection advisors suitably qualified and experienced shall be appointed whose names shall be submitted to OWNER / ENGINEER. Dosimetry and surveillance of personnel engaged in such work shall be maintained in accordance with regulatory requirements.

6.17 PERSONAL SAFEGUARDING

6.17.1 Personal Protection Equipment (PPE): General

CONTRACTOR shall provide his employees required PPE meeting the requirements of the stated IS Specifications and Guidelines or equivalent International Standards as may be prescribed by the ENGINEER from time to time. CONTRACTOR shall have instituted good working procedures and practices in providing PPE, maintenance, issue and training on their use. All PPE shall be periodically checked to ensure worn, damaged equipment are replaced expeditiously.

a) Control of use of issue, use and maintenance of PPE

Employees shall be responsible for PPE issued to them. CONTRACTOR shall meet requirements of IS8519: 1977 titled "Guide for selection of Industrial safety equipment for body protection" or any equivalent international Specification that the ENGINEER/OWNER may prescribe.

b) Head Protection:

CONTRACTOR shall comply with requirements as per IS 2925. Hardhats shall be used and worn where a hazard of falling or flying objects exist. Hard hats intended for use by visitors shall have replaceable paper lining.

c) Eye and face protection:

Eye protection shall be worn during all operations by operators and people in the vicinity, where there is a danger of flying particles of metal such as generated during use of hand tools such as chisels, grinding, welding and cutting lathe work on brass and cast iron, acid and alkali splash, and high pressure jet cleaning or insulation removal from heights using high pressure jets. CONTRACTOR shall meet the requirements of IS 8540:1978 titled "Guide for selection of Industrial safety equipment for eye and face protection.

d) Footwear:

Safety shoes, boots and gumboots fitted with steel toe-caps of approved quality conforming to prescribed Indian or international standards. Wearing of unsafe safety shoes such as jogging shoes, tennis shoes, slippers and sandal etc. shall are prohibited. CONTRACTOR shall meet the requirements of IS 10667:1983 titled "Guide for selection of Industrial safety equipment for protection of foot and leg.

e) Protective clothing:

CONTRACTOR shall prevent hazards of loose clothes worn by workmen getting caught in moving machine parts. Loose and thin garments such as Dhoti and pyjamas shall be prohibited. While CONTRACTORs shall ensure that all workmen wear long sleeved shirts, jackets or the like with the sleeves rolled down and secured at the cuff, long pants/ trousers extending upto the top of the safety shoes so as to prevent injuries caused by contact with heat, cold abrasive and sharp surfaces shall be strictly enforced. Such protective clothing shall be mandatory in hazardous areas especially during start-up operations involving hot, inflammable, and other chemical hazards, furnaces and Boilers and such fired equipment and asphalting plants. Personnel exposed to acids and alkalies hot fluids and steam during such operations shall be provided with appropriate heat or corrosion resistant clothing. CONTRACTOR shall meet the requirements of IS 8990:1978 titled “maintenance and care of industrial safety clothing.”

f) Hand Protection:

CONTRACTOR shall provide appropriate hand gloves as per IS 8807:1978 titled: ”Safety equipment for protection of arms and hands” to prevent injuries to hands during work. Contactor shall maintain appropriate inventory of gloves for different applications like Acid/ alkali handling, general-purpose work gloves and asbestos or heat resistant Hand gloves etc.

g) Safety harness: Fall arrest:

CONTRACTOR shall provide safety harness or means of restraint such as safety Belts, harness and lifelines etc to workmen engaged to work in heights such as Open –sided Floors, Open-sided scaffoldings, floor and roof openings, overhead construction works of various nature etc where there is a falling hazard of six feet or above. To prevent any fall from a height of 2 Meters or above, storage, issue, wearing and maintenance of safety harness shall be under strict supervision and records shall be maintained. All fall arrests shall consist of full-body harnesses, lanyards with shock absorbers, lifelines, rope grabs and associated hardware. Two alternate lanyards shall be used to facilitate tying off at a new location before disconnecting from the previous location of Practices for safety harnesses and fall arrests shall conform to **IS 4912:1978,IS 11972:1987,IS 8519:1977** or equivalent international codes.

h) Falling object protection:

Where work is in progress in elevated areas, barricades, barrier tapes signs and such entry restriction devices shall be used to keep area below clear of personnel to prevent injury due to falling objects. If work is required in the area below elevated work area, it shall be scheduled at a time different from elevated works. The workmen below shall be protected from falling objects by the debris net or a catch platform with an adequate toe board to prevent material from falling off. Use of safety net for elevated works shall be considered in the work-permits where appropriate. Where a lift is made above a working area, the area below the path of the lift shall be cleared of personnel during the lift and barricaded and guarded to prevent entry of persons generally in conformity with IS 4912, IS 11972 and IS 13416 for protective barriers in and around building and preventive measures against safety hazards in work places and safety requirements for floor and, wall opening, railings and toe-boards.”

i) Respiratory Equipment:

CONTRACTOR shall maintain where appropriate, procedures for training and use of self-contained breathing apparatus. (SCBA) SCBA shall be provided

together with lifelines and rescue teams to safeguard personnel working in areas where gases such as Carbon monoxide, methane chlorine and such life endangering atmospheres. CONTRACTOR shall meet requirements of IS 9623:1980 for "selection, use and maintenance of respiratory protective devices". CONTRACTOR shall have trained adequate number of personnel including the identified fire fighting teams, hose teams and Safety Appointees in the use of SCBA. CONTRACTOR shall use the periodic Safety Drills to demonstrate, train and establish competence of personnel in the use of SCBA.

j) **Hearing conservation:**

CONTRACTOR shall ensure reasonable precautions are taken to avoid injury to the hearing of the employee. All noise levels shall be controlled within 85 dBA. CONTRACTOR shall identify noise areas where noise levels exceed prescribed safe level for arranging for appropriate Engineering revision. Where this is not feasible, appropriate Earmuffs or protectors shall be provided to workmen ensuring they are worn by those exposed to noise levels beyond safe levels. Periodic hearing acuity tests shall be conducted on such persons exposed to high noise levels to ensure that they do not suffer any hearing impairment` as per requirements of IS8520: 1977.

6.17.2 Manual handling: & ergonomics

a) CONTRACTOR shall have procedures to identify risks involved in manual handling operation and tasks. He shall ensure appropriate training to prevent any possible injury. Full use of mechanical aids shall be made to avoid risks arising out of such manual handling. Employees shall be adequately trained on such manual tasks and related safety precautions to reduce the risk of injury to personnel engaged in such work.

b) CONTRACTOR shall undertake ergonomic study of manual operations to prevent musculoskeletal injury during manual handling, besides visual fatigue and mental stress giving considerations to matters such as seating. Lighting and ventilation etc.

6.18 FIRE PROTECTION AND PREVENTION

6.18.1 General Requirements

a) Where OWNER maintains the Fire Protection Equipment, CONTRACTOR shall comply with OWNER 's fire regulations, warning signals and procedures. He shall arrange to train his personnel meeting the prescribed qualifying competence needs, in requisite numbers in the operation of such fire protection equipment and systems.

b) Risk assessments shall be carried out to identify potentially vulnerable areas to provide sufficient quantities of correct type of extinguishers and ancillary equipment to deal with various types of fire hazards.

c) Where required by the contract CONTRACTOR shall provide appropriate type of extinguishers close to areas of fire hazard but not too close they are cut off from use during a fire. Water based extinguishers shall not be positioned close to or used on electrical equipment.

d) Extinguishers shall be marked / labelled and recorded with location particulars in a register. They shall be inspected at monthly intervals to ensure they are in operable sound condition. There shall be a systematic plan for servicing,

repairing and recharging fire extinguishers and for recording such dates on the register and equipment.

e) The location of firefighting equipment shall quickly and easily be identifiable especially in emergencies in a conspicuous manner painted as high as possible to identify the location of the extinguisher to prevent it from being obscured by machinery and goods stacked in front and to return the equipment to its location after emergency use in other locations. In order to ensure this, "Keep Clear" area shall be demarcated and maintained. Location plans of extinguishers and fire-fighting equipment shall be prominently displayed when desired by the OWNER.

f) SR and SA shall be trained on firefighting techniques who shall co-ordinate and control fire protection and prevention programmes.

g) Where required by contract, CONTRACTOR shall maintain alarm systems powered by mains and by battery for back up. Where required by the Contract, Emergency lighting shall be provided to aid evacuation in poor lighting conditions following the alarm. The alarm system shall be made known to all employees. When OWNER extends these facilities for use by CONTRACTOR, He shall provide appropriate training to his personnel in the use of such emergency facilities and duties

h) A clear written procedure for action in the event of fire should be produced. Fire teams and Hose teams shall be identified and their responsibilities during emergencies shall be detailed in writing. Personnel shall be trained on their fire duties and use of fire-fighting equipment. Regular drills shall be conducted to test procedures and to validate them. Fire instructions and emergency procedures shall be displayed throughout the premises. Emergency response Procedures are detailed in Sl.No 5.0 hereunder.

i) A means of escape shall be provided in all work areas and storages and maintained and kept free from obstruction. All exits shall be clearly marked and kept unlocked whilst the premises are in use. Escape routes shall be protected from fire.

j) When a Hot work Permit is issued, CONTRACTOR / SR shall ensure:

i. Identification of combustible such as paper, cardboard and wood and moving them away from area where Hot work is undertaken using open flame or electric arc.
ii. Determination that flammable vapours and liquids are not present ,
iii. Protection of floor and wall openings to keep out sparks,
iv. Determination that Sprinkler and Hydrant and other installed fire systems are functional,
v. Establishing a Fire-watch with fully loaded extinguishers or charged water-hoses throughout the operation and 30 minutes after completion of operation,
vi. Adequate ventilation for welders, by means of natural air movement. Local exhaust ventilators, or air-line respirators as required,
vii. Workmen performing the task are adequately briefed on job safety analysis, hazards and risks and the safeguards against risks.

6.18.2 **Security**

a) Where required by the contract, Security shall do all that is reasonably practicable to ensure the safety of employees and property of the company in the face of accidents by fighting fires, and containing losses due to pilferage, theft, vandalism and industrial espionage both by employees and external elements. Security personnel shall be appropriately competent, receive adequate safety training. Security shall routinely report on a standardised basis on aspects such as violation of fire-protection Rules, use of alcohol and narcotic drugs, condition of security fencing, floodlighting and storages etc.

b) Where the project is located where a number of other companies are in operation, CONTRACTOR shall plan for mutual assistance Programmes in cases of emergencies, as are practiced in the area in conjunction with OWNER.

c) Where common boundaries exist between companies, CONTRACTOR in conjunction with OWNER shall co-ordinate security control over factors common: such as Floodlights, Fencing, pipelines containing gas, fuel and electricity.

d) Security shall be represented in Safety committee through a safety appointee nominated from the area.

6.19 EMERGENCY PLANNING/ EMERGENCY RESPONSE (ER)

a) CONTRACTOR shall plan to deal with emergencies. Emergency Response shall be specific to the job site. ER shall be written and communicated to all employees. ER shall identify for the potential for and responses to incidents and emergency situations and for preventing and mitigating the likely illness and injury that may be associated with them.

b) The CONTRACTOR shall review his emergency preparedness and response plans and procedures in particular after occurrence of incidents or emergency operations

c) CONTRACTOR shall designate his emergency team with their duties during emergencies defined, Including those of the hose Teams, medical personnel, first-aiders and security. CONTRACTOR shall maintain a procedure as to how his emergency organisation shall liaise with OWNER 's representatives in ER

d) The CONTRACTOR shall also periodically test such emergency procedures by conducting Mock-drills and use the experience for updating the emergency Plan and for training the Employees on the perceived competence needs.

e) The emergency Response Plan of the CONTRACTOR shall be under the control of the SR who shall be able to co-ordinate with the OWNER for liasing with Government agencies neighbouring industries and the community

f) The plans shall be designed to allow people to work under disaster conditions when normal services such as telephone water, light power, transport and sanitation are not available and first aid and fire fighting facilities are not able to cope up with sudden demand on services.

g) The telephone numbers, of ambulance, Police and Managers, OWNER’s key Executives shall be prominently displayed in the identified Emergency Response Centre.

6.20 PREMISES AND HOUSE -KEEPING

6.20.1 Orderly Work-Place

CONTRACTOR shall maintain a well-managed safe working place in sound clean condition. CONTRACTOR shall ensure that there is a place for everything and everything in its place so that optimum use is made of valuable floor space with commensurate cleanliness and reduced handling time. He shall ensure that his entire infrastructure including temporary and semi temporary buildings are kept clean and well maintained.

6.20.2 Good Lighting Natural and Artificial

CONTRACTORs shall provide lighting natural or artificial to enable work Processes are carried out safely. Artificial lighting shall be adequate especially in the nights and emergencies. The lumen levels shall meet the statutory requirements.

6.20.3 Ventilation Natural and Artificial

CONTRACTOR shall ensure that workplaces are ventilated with at least prescribed amount of clean or cleaned fresh air of a suitable temperature, especially where toxic or irritating substances are present such as welding, vehicle exhaust fumes, irritating dusts, organic solvents or any other inimical atmosphere creating health or safety hazards.

6.20.4 Welfare and Hygiene Facilities

CONTRACTOR shall provide welfare facilities to ensure a high standard of cleanliness for all activities and rest. CONTRACTOR shall provide facilities for his employees such as ablutions and toilets and change rooms kitchens and cafeterias adequate and in a clean and hygienic state.

6.20.5 Pollution to Ground, Air and Water

CONTRACTOR shall strive to exceed established minimum performance norms in waste and pollution control. All drains shall be identified as clean water and foul water to aid non-harmful disposal.

6.20.6 Traffic Routes and Aisles

CONTRACTOR shall arrange to separate pedestrian and vehicular including material handling equipment traffic wherever possible and maintain the routes clear of obstruction. To ensure safety of users, clear painted demarcation is encouraged as a discipline to be enforced.

6.20.7 Stacking and Storage Practice

a) CONTRACTOR shall ensure stacked material is bonded on a stable and level footing capable of carrying the mass of the stack. Adequate clearances shall be provided between the sides of the stack and top to facilitate unimpeded access to service equipment like overhead wiring, cranes, forklifts and firefighting equipment, and hoses. Free-standing stacks of gunny bags and sacks such as Cement bags shall be stacked to prescribed safe-stack heights with layers formed for stable bonding, preventing slippage causing accidents. Stacking against walls shall not be permissible.

b) CONTRACTOR shall maintain the premises and surrounding areas in clean and clear manner with safe access and egress. There shall be sufficient and adequate storage racks, shelving, bins and pallets and material handling equipment to stack his construction materials such as Pipes, structurals and

his construction enabling materials. Unwanted materials shall be promptly moved away for efficient material movement.

6.20.8 Storage of Hazardous Materials

a) Hazardous materials shall be stored on solid bases. Solid bases shall include, compacted earth, pallets, concrete or asphalt platforms or paving. Hazardous materials shall be stored, stacked and secured to prevent toppling, spillage or other unintended dislodgement. Aisles and clearances shall be as detailed under 6.6 above. Hazardous materials shall be stacked in such a manner that an observer standing in the aisle can read their labels and legends

b) Each hazardous material contained hall be identified by a legible or legend as per governing statute, code or regulation. The label shall identify the item, quantity and appropriate warnings.

c) Hazardous materials which if brought in contact with each other could react or pose equal or greater hazard than either material stored alone shall be stored at a distance not lesser than twenty feet apart.

d) Warnings shall be posted and maintained in a legible condition at all access points clearly defining the specific hazardous nature of the stored materials such as "Corrosive", Flammable", "Explosive", “Oxidising", "Compressed gas" or other hazardous nature

e) Where hazardous materials are unloaded in CONTRACTOR's storages maintained at site in a semi-permanent installation, such installations shall be approved by relevant statutory bodies. Copies of licences for storage shall be lodged with OWNER. The Containers and storages shall display quantities stored with name of the hazardous material and the UN Hazard classification label in prescribed colour code prominently painted in a conspicuous manner.

f) CONTRACTOR shall inspect the hazardous storages and installations on a daily basis and shall undertake any requisite preventive action necessary to avoid safety risks.

6.20.9 Storage of Flammable / Explosive Materials

a) CONTRACTOR shall secure flammable and or explosive materials against accidental ignition.

b) Storage facilities for flammable liquids such as Petrol, Diesel and Kerosene and Lubricants as well as the quantities stored shall meet the legal and statutory requirements. They shall be stored in approved fire-resistant rooms with a sump of sufficient volume to contain any spillage.

c) The electrical fittings shall be flame -proof and shall be on a strict maintenance schedule.

d) Containers shall be appropriately bonded in receptacles into which low flash point fuel is decanted.

6.20.10 Compressed Gas Cylinders

Compressed gas cylinders shall be stored and secured in the upright position at safe distances shielded from welding and cutting operations. Compressed gas cylinders in storage shall be shut off and torches, hose and manifolds removed and capped. Cylinders shall be periodically checked for leakages. Storage shall meet

requirements of Gas Cylinder Rules 1981.Compressed gas storages shall be provided with safety relief valves, Safety valves and rupture disc to protect them from overpressures and shall be appropriately designed to ensure their continued availability in the face of process changes.

6.20.11 Scrap and Refuse Bins-Removal System

CONTRACTOR shall ensure that he has sufficient waste bins that are identified for different wastes and maintained in clearly demarcated areas. Wastes with oily or other ignitable materials such as Oily cotton wastes and Hand gloves shall be stored separately with covers to prevent fires and shall be made of metal. Different Wastes shall be segregated and stored separately and disposed off. They shall be emptied at routine intervals to prevent that they do not overflow with wastes.

6.20.12 Coordination with the OWNER'S safety officer

The CONTRACTOR's safety officer shall adhere to the safety discipline imposed by the OWNER. The CONTRACTOR shall coordinate/liason with safety officer of the OWNER to ensure accident free atmosphere. The CONTRACTOR's safety officer shall attend all the meetings convened by the OWNER and ATR periodically. The CONTRACTOR shall display relevant safety banners as required at specific site requirement.