HSE Questions and Answers

HSE
PROBABLE QUESTIONNAIRE FOR INTERVIEW

HSE Questions and Answers

Q. What is the Safety?

Safety is freedom from unacceptable risk of harm. (The word safety drives from the Latin word „SALVUS" means uninjured and healthy)

Q. What are the responsibilities of an HSE Officer?

- The HSE Officer acts an advisory capacity to the management and supervision with regards Health and Safety Environment,
- He is to monitor and ensure that the activities are being performed with the acceptable safety norms.
- Helping supervisors to identify the hazardous and unsafe conditions and ensuring rectifications.
- Conducting tool box meeting, Supervisors safety meeting, conducting training in various topics, conducting safety incentive program, conducting safety auditing/inspection.
- Taking disciplinary action against the violations.
- Conducting risk assessment and JSA, pre task meeting and all other project related safety requirements.
- Keep track record all incidents at site.
- He is to investigate hazards and dangerous occurrences, examine the cause of accident, carry out safety inspection on site and what remedial steps/action has been under taken.

Q. What is a 'Permit to Work' Procedure / Work Permit System?

- The „Permit to Work" (PTW) Procedure is a formal written system, which utilize a document to control the work by means of potential hazards identification and risk assessment.
- The work permit is also a means of communication among various supervisors or their respective belonging to operation, maintenance, controlling teams and contract personnel, who are involved in work preparation and / or its execution.

HSE Questions and Answers

Q. Explain Types of Work Permit normally used in oil & gas industry?

Types of Work permits: 5 types of work permit

1. Hot Work Permit (red)
2. Cold Work Permit (green)
3. Radiography Permit (yellow)
4. Vehicle/mobile plant entry work permit
5. Confined Space Entry Permit

(a) Cold Work Permit:

A document that specifies precautions identifies hazards and controls all work that is not hot and radiographic in nature.

(b) Hot Work Permit:

A document that specifies precautions, identifies hazards and controls all work involving actual naked flames, sparks or has potential for creating sparks or heat.

(c) Radiography Work Permit:

A document that specifies precautions identifies hazards and control all work involving radiographic in nature.

(d) Vehicle / Mobile Plant Entry Permit:

A document that specifies precautions identifies hazards and controls all work involving entry of a vehicle or mobile plant into a hazardous area.

(e) Confined Space Entry Permit:

A document that specifies precautions identifies hazards and controls all work involving entry to an enclosure, which has limited means of entry or exit, not designed for continuous occupancy.

Q. Explain Each Work Permit Validity? (as per KOC)

Hot / Cold / Radiography Permit:

Valid for a maximum duration of seven consecutive days from the date of issue subject to renewal by the permit issuer.

Note: Validity Period for Cold or Hot work permit in Non-Hazardous area can be extended for a maximum one month with approval from concerned Team Leader.

Confined Space Entry Permit:

Valid for one continuous work shift or part thereof; however the permit is to be renewed / re-endorsed in case of crew change, transfer of responsibility, work suspension or as recorded in the permit.

Vehicle / Mobile Plant Entry Permit:

Valid for one continuous works shift for Vehicle entry, whereas for Mobile Plant Entry it is valid for maximum 7 consecutive working days from the date of issue subject to renewal by Permit Issuer.

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Q. Explain Each Work Permit Distribution? (as per KOC)

Work Permit will be made out in FOUR COMPIES

- The Original for worksite
- 1st copy for Permit Applicant
- 2nd copy of all permits (except cold work permit) forwarded to FIRE TEAM by the permit issuer
- 3rd copy shall be retained by the issuing authority

Note: After completion of work and permit closure as per procedure…
Original kept on record with Permit Issuer. 1st copy shall be retained by the Permit Applicant (for minimum 6 months). 3rd copy can be given to Worksite Supervisor for their record.

Q. What is e-WP (Electronic Work Permit)? (as per KOC)

Electronic Work Permit (e-WP) is a web-based solution through KOC intranet to manage electronically the authorization process of non-routine activities which are carried out in KOC business as per Permit to Work Procedure (KOC.SA.004).

Q. What important details a work permits gives?

It is a form, which is signed by higher responsible people to carry out the specific job. It clearly states:

- What is to be done,
- Where,
- When and
- What are the safety precautions to be taken.

Q. What is Cold work, Hot Work and Radiography work?

Cold Work:

Any work that does not involve a source of ignition or naked flame or does not have spark generating potential is classified as a Cold Work.

Hot Work:

Any work which involves the use of naked or a source of ignition or spark generating potential is classified as a Hot Work.

Radiography Work:

Any work that involves the use of a radioactive source, shall be covered by a radiography work.

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Q. What is the Excavation? And types of excavation?

Any man made cavity, cut, trench or depression on an earth surface formed by earth removal.

Types of Excavation:

A. **Manual Excavation:** The excavation without using any powered equipment.
B. **Mechanical Excavation:** The excavation work using any electrical or mechanical equipment.

Q. Explain about Excavation Notification?

Excavation notification is a document to notify concerned authorities, who have responsibility and jurisdiction for safety and integrity of above ground and underground services existing at the propose site of excavation.

- Excavation notification must be supported by a work permit.
- Excavation notification is valid for **90 days** from the date of issued.
- Excavation notification is required for all excavations **regardless of depth**.

Q. Why Excavation Notification required for excavation?

Excavation notification gives detailed information about the underground facilities and it is to be signed by all KOC concerned departments to confirm that the proposed excavation location has been identified and all safety measures have been taken for the existing underground facilities.

Q. What is EXCAVATION HAZARDS?

- Cave in or collapse of soil
- Risk due to presence of underground installations, pipelines, cables.
- Drowning due to water seepage into trench.
- Soil vibration due to machinery / heavy vehicles operations in the vicinity.
- Lack of Oxygen or asphyxiation etc.
- Underground obstruction or damage to buried pipelines & services
- Accidental fall of personnel or equipment inside a trench
- Struck / hit by excavating machinery
- Dropped / falling objects
- Flammable & / or toxic gas release
- Exposed to airborne contaminants
- Fire & explosion
- Electrical shock due to contact with energized electrical / telecom cable.
- Possible presence of explosive devices

- Damage to shallow underground services due to weight of heavy equipment such as mechanical excavator.
- Encountering wet soil (mixed with water) or reaching water table.
- Encountering contaminated soil

Q. Enlist precaution to be taken prior to taken to and during excavation work?

OR

What is the safety precautions required for a safe excavation?

- No excavation work in KOC area without clearance of *Explosive Ordinance Disposal (**EOD**)*.
- No mechanical excavation closer than **5 meters** to any **hydrocarbon** carrying pipeline.
- No mechanical excavation closer than **3 meter** to a **non-hydrocarbon** carrying pipeline, cables and services.
- For any excavation **deeper than 1m**, ladder must be positioned projecting minimum 1 meter above the edge of the excavations.
- Ladders shall be provided **every 7.5 meters** (25 feet) of lateral travel in the trench.
- Ladders shall be securely supported at the bottom as well as at the top.
- Excavated material shall be placed **1m** from the edge of the excavation for depth up to 1.2 meter.

  (Accordingly placement of excavated material shall be increased proportion to the depth of excavation.)
- Heavy equipment, machinery shall be kept **at least 3 meters away** from the edge.
- Any walkway across trench shall have scaffold type platform with handrails.
- All trenches shall have barrier (such as fixed guardrails) and reflective warning notices clearly displayed. Flashing lights are mandatory during poor visibility.
- The access to plant, equipment and emergency services must not be obstructed by the trenches.
- No mechanical excavation is allowed inside the existing KOC facilities (Gathering Center, Booster Station, water injection and handling facilities, etc.)

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Q. What is confined space?

- Any enclosure having a limited means of entry & exit and it is not designed for continuous occupancy.
- There will be a presence of any hazardous substances such as flammable and toxic gases, oxygen deficiency, hot or humid atmosphere or any combination of it.

Examples: Process vessels, Tanks, Bins, Stacks, Large pipe, Duct, Pits & Trench etc. Any excavation with depth more than 1.2 meter.

Q. What are the Confined Space Hazards?

A confined space may have one or combination of the following hazards:

- Oxygen deficiency
- Presence of flammable, combustible or pyrophoric materials (HC, Sludge etc.)
- Presence of toxic gases, corrosive or hazardous materials (H2S, Co, NH3 etc.)
- Poor illumination, Ventilation & Communication.
- High temperature and humidity.
- Limited entry & exit / Restricted access.
- Restricted movement inside.
- Falling / Tripping hazards
- Presence of reactive or self-igniting material.
- Hazard due to electricity or moving machinery.
- Hazard due to pressurized fluid.
- Hazard due to nature of work carried out inside confined space.

Q. What is the procedure for entering a confined space hazards?

OR

What are the important PRECAUTIONS for confined space?

Procedure for entering confined space:

1. Permit must be procured form operations, making sure of the following.
   a. Complete isolation of the space to be entered.
   b. Draining, depressurization and purging or cleaning should be performed.
   c. Gas test should be conducted to ensure no hazardous atmosphere is present.
   d. Space ventilation.
2. A Pre task meeting must be conducted with all authorized entrants prior to entering confined space.

3. The attendant (Stand by man) shall be assigned at the entrance to maintain communication with employees working inside to ensure their safety. A log book shall be maintained at the entrance to keep track of the people inside the space.
4. Safety attendant must be trained and authorized to use gas testing equipment.
5. Entrants must wear body harness, and if necessary a life line be attached to the harness to avoid entry-rescue.
6. Lighting should be provided, if necessary a maximum of 24 volts, lighting should be used attached a GFCI.
7. Only intrinsically safe or explosion-proof equipment shall be used inside.
8. Depending on the situation, emergency rescue team may be put on standby.
9. If an emergency occurs within the confined space, the standby person must not enter it until rescue team arrived.
10. Barricade the area with warning sign board.

Q. What you know about working in a confined space entry? OR

Explain about confined space entry?

Any enclosure having a limited means of entry & exit and it is not designed for continuous employee occupancy.

- Before entering in the confined space, must need to obtained a confined space entry work permit, make sure that all required isolation being done.
- Frequently gas test is to be carried out to confirm that area is free of toxic gas or flammable atmosphere.
- If the area is contaminated or it has oxygen deficiency the provided BA sets or air line respiratory system.
- Conduct pre-task meeting for the employees who will be entering inside the confined area and get there signature to conform that they are aware of the hazards and safety measures.
- The attendant (Stand by man) to assigned at the entrance. A log book shall be maintained at the entrance to keep track of the people inside the space. The attendant shall not be assigned to other duties. If an emergency occurs within the confined space, the standby person must not enter it until rescue team arrived.
- The entering people should use body harness with lifeline for the emergency rescue purpose.
- Any required electrical lighting or tools should not exceed more than 24 volts and attached with GFCI / ELCB. It should be intrinsically safe or explosive proof.
- Barricade the area with warning sign board.

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Q. Explain H_2S? OR What is H_2S and its characteristics explain?

- H_2S is produced or generated by decomposition of organic materials.
- It is a highly toxic gas and highly flammable.
- Its smell like rotten egg at low concentrations and not detectable by order at high concentration.
- It is highly flammable. (flammable at 4.3% to 45.5% by volume in air)
- It is colourless.
- It is heavier than Air.(1.19)
- It is highly soluble in water and other liquid.
- When burned or flared it forms sulpher dioxide (SO_2) which is also colorless and highly toxic gas.
- The exposure limits **10 PPM is the maximum allowed for 8 hours.**
- Increasing exposure will cause headache and irritation of eyes.
- 800 PPM or more will be instantly fatal.

Exposure Limit:

TLV-TWA of H_2S	=	10 ppm
TLV-STEL of H_2S	=	15 ppm
IDLH of H_2S	=	100 ppm

Note: - Up to 10ppm work can be done without respiratory protection system.
- 10 to 100ppm work can be done by SCBA or Air lined breathing apparatus.
- Above 100ppm work not permitted, allowed only for rescue.

Q. What are prominent H_2S HAZARDS?

H_2S Hazards:

- **Eyes and respiratory irritation.**
- **Dizziness, headache, nausea, abdominal pain.**
- **Loss of consciousness, Brain damage possible, death / fatal.**

Q. Explain the precautionary measures to be taken while approaching H_2S prone area?

Precautionary Measures – H_2S:

- Sufficient number of escape masks shall be kept in areas where H_2S is liable to present.
- Incase H_2S presence is suspected in an area, the persons must put on escape mask immediately and toxic gas test must be made immediately with appropriate detector to determined the concentration of H_2S in air.
- Working person should be equipped with personal detectors and alarming device to alert in case of H_2S presence.

- Incase of H_2S alarm, all personnel should vacate the area after donning the escape set / breathing apparatus and report to the designated assembly point for mustering.
- If working in H_2S contaminated atmosphere must wear suitable BA set and work in pairs to support and rescue each other in the event of difficulties.
- Know the wind direction and evacuate in the cross wind direction incase of H_2S leak.
- Never go to a low-lying area during H_2S leak.
- Paste H_2S warning sign in H_2S prone areas.
- The presence or suspected of H_2S in any part of the plant or sewer shall be reported immediately to supervisor and respective area fire station for arranging rescue and support.

Q. How to treatment of persons affected by H_2S?

Positive pressure breathing apparatus must be worn by any persons attempting a rescue.

- The victim must be immediately moved to fresh air, possibly in the upwind direction of the gas leak. The rescuer must be outside the contaminated area before removing his/her personal BA set.
- **If the victim has stopped breathing**, resuscitation must be started immediately, using artificial respiration or a resuscitator if available. Resuscitation must be continued until the victim starts breathing unaided or until qualified medical assistance arrives. Medical help must be summoned as soon as possible.

Q. Define TLV-TWA, STEL and IDLH?

TLV –TWA:

Time Weighted Average (TWA) concentrate of the contaminant in air over the normal work shift of 8 hours, to which workers can be exposed without respiratory protection in a 40 hour workweek.

TLV-STEL:

Short Term Exposure Limit (STEL) when exposed only for a short period of 15 minutes. This maximum concentration can be allowed to breathe 4 times during 8 hours with minimum 1-hour interval between exposures.

IDLH:

Minimum concentration of contaminant in air which is Immediately Dangerous to Life and Health (Note: Air supplied respirators are required in IDLH atmospheres.)

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Explosive range (TLV, STEL & IDLH) for different GAS:

GAS	TLV- TWA (PPM)	STEL (PPM)	IDLH (PPM)
Hydrogen Sulphide **(H_2S)**	10	15	100
Sulphur Dioxide **(SO_2)**	2	5	100
Ammonia **(NH_3)**	25	35	300
Chlorine **(Cl_2)**	0.5	1	10
Carbon Monoxide **(CO)**	25	50	1200
Acetylene **(C_2H_2)**			

Q. What is Flash Point (FP)?

Minimum temperature at which a flammable mixture of gas or vapor in air will momentarily flash when a source of ignition (spark) is introduced.

Q. What is Auto Ignition Temperature (AIT)?

Minimum temperature required to initiate self-sustained combustion of a solid, liquid or gas in the absence of a source of ignition.

Q. What are LEL/LFL and UEL/UFL?

Lower Explosive Limit (LEL): or (Lower Flammable Limit)

Minimum concentration of vapor or gas in air which will burn when a source of ignition (spark) is introduced.

Upper Explosive Limit (UEL): or (Upper Flammable Limit)

Maximum vapor/gas to air concentration above which flame propagation will not occur, i.e. the mixture is “too rich” to burn.

Note-1: Flammable Gas Detectors (Meters) measure % LEL, hence actual LEL means 100% of full-scale reading of the meter. Below LEL (100% of meter reading), a mixture is “too lean” to burn.

Note-2: LEL of airborne combustible dust: If the dust obscures vision at a distance of 5 feet (1.52 m) or less it is considered as at LEL (ex. Sulfur or coke).

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Explosive range (Lower & Upper) for different GAS:

Flammable GAS	LEL / LFL (by volume in air)	UEL / UFL (by volume in air)	AIT (by volume in air)
Hydrogen Sulphide **(H_2S)**	4.5 %	45.5%	260 C / 500F
Sulphur Dioxide **(SO_2)**			
Ammonia **(NH_3)**	15 %	28%	651.57 C / 1204 F
Chlorine **(Cl_2)**			
Carbon Monoxide **(CO)**			
Acetylene **(C_2H_2)**	2.5%	80%	
Methane-**CH_4** (Natural Gas)	5%	15%	
Petrol (Gasoline)	1.4%	7.6%	

Q. What is scaffolding?

Scaffolding is a temporary working platform to provide supports both men and materials for working place. It is used in maintenance, construction and demolition work etc.

Types of scaffoldings:-

- Permanent scaffolding
- Hanging scaffolding
- Suspended scaffolding
- Mobil scaffolding.

Q. What are the points to be checked while green tagging erected scaffolding?

Before using of scaffold check the tag (7 days validity).

Green tag we can use the scaffold and Red tag for not use and Yellow tag use only for scaffolding works.

- Level and firmness of the ground.
- Sole plate
- Base plate
- Standards
- Ledger
- Transom
- Couplers
- Planks (boards)
- Toe boards
- Braising

- Guard rails
- Mid rail
- Out riggers
- Ladders

Q. What is Potential Hazards of scaffolding?

- Collapse of Scaffolding.
- Falling from height.
- Falling object.
- Slip & Trip hazards.
- Pinch point hazards / Sharp edges
- Opening without guardrail.
- Scaffold erection during storm or high winds, raining and poor visibility.
- Blocking emergency access and walkways

Q. What is the cause of scaffolding failure?

- Slipping of unsecured ladder.
- Use of unsuitable scaffold or faulty materials.
- Inadequate or irregular platform width.
- Omission of guard rails or toe boards.
- Failure to proper secure the scaffold to the building or to brace it adequately.
- Overloading on the scaffold platforms.

Q. What is the precaution during scaffolding erection?

- Scaffolding erection, dismantling should be done under the supervision of a *COMPETENT PERSON* (Scaffolding Supervisor).
- „Red Tag" means Danger "do not use" and Green Tag means "scaffold complete-ready for use" when completed.
- Gap between boards/planks should be 1 inch (25mm).
- Top guardrail, midrail and toe board should be provided.
- Guard rails and Toa boards shall be fitted to the inside of standards.
- Guard rail should have a height between 915 mm (0.9 m or 90 cm or 3" feet) to 1143 mm (1.15 m or 3" 9")
- Toe board should be **6" (15 cm)** high and secured with toe board clips.
- If scaffold to be erected on soft ground should be used sole plate.
- Worker shall be not work on scaffolds during storms or high winds or poor visibility.
- Sole plate shall extend under at least two standards.
- Base plates with screw jacks should be proper scaffold leveling adjustment.
- All standard shall be vertical.
- Ledgers shall be securely fixed to standards couplers.

- Scaffolds should be properly braced by cross bracing or diagonal braces or both for securing vertical members together.
- Access ladder must be provided for any platform & clamped with scaffold structure.
- Ladder should be **4:1 ratio** and **angle 75^0**.
- Ladder should be rise **1 meter** (42 inch) above from the landing place/platform.
- Scaffold should be not obstruct access to/from any *fire fighting equipment / emergency equipment, operating area equipment, instrument and control panels, ladders, stairways* etc.
- Scaffold platform opening should be secured with guardrail and sign board.
- All scaffolding couplers should be tightened.

Q. What are the Hazards Associated with Electricity?

Hazards:

- Inadequate wiring.
- Exposed electrical parts
- Wire with bad insulation.
- Undergrounded electrical systems and tools.
- Overloaded circuits
- Damaged power tools and equipments.
- Using the wrong PPE and tools
- Overhead Powerlines.
- All hazards are made worse in wet conditions.

Q. What are the Precautions to be taken to avoid electrocution?

- All electrical work must be covered by an appropriate work permit.
- The authorized person approved by the relevant Maintenance Team can carry out electrical work.
- Electrical safety floor mats made from a special grade of insulating rubber shall be provided in front of switchboards or high-voltage equipment to protect personnel against accidental electric shock.
- Warning tape on top of buried cables and electrical cable tiles must be provided as an early warning notice for excavations.
- All portable electrical equipment must be approved by the Maintenance Team and shall be used as per suitability for the relevant area only.
- Do not reach blindly into areas that may contain energized parts.
- Do not enter into a space where adequate lighting and working space is not available.
- Only Industrial type plugs and sockets shall be used on all locations other than offices and houses.

- All testing and measuring equipment used for the electrical works should be tested, calibrated and documented.
- Ensure all equipments are grounded and should be attached GFCI / ELCB.
- Inspect electrical equipments before use.
- Electrical Panel, Junction boxes, pull boxes and fitting must have approved covers.
- Unused openings in cabinets, boxes and fittings must be closed.
- Don"t overload on a circuit.
- Maintain the distance from overhead power lines during the Crane activity and scaffolding erection and other activities.
- All cable of power tools / portable tools should be double insulated.
- Don"t use damage extension cords and don"t touch live wire and another wire at a different voltage.
- Damaged equipment must not be touched until the isolated.
- Disconnect the power when not in use and when changing accessories.
- Use the appropriate PPE for the job.
- Competent, qualified and approved personnel should be carry out testing & energizing of the equipment.
- Electrical lock-out and tag-out system should be used when working on electrical equipments.
- In the event of fire on electrical panel or equipment, the electrical power supply must be isolated and suitable Fire Extinguisher shall be used to extinguish the fire.

Q. What are safety precautions you will take for a temporary electrical connection?

- Temporary wiring shall be guarded or isolated by elevating to prevent accident contact with workmen or equipment.
- Vertical clearance above walkways shall not be less than 3m (10feet) for circuits carrying 600V or less.
- Wires shell is insulated from their support.
- Temporary festoon lighting strings shall be made up with cords having lamp sockets and connections protected by insulating coverings.
- Extension cord shall be of approved types and used for the purpose for which they are made.
- Expose empty light sockets and broken bulbs shall be prohibited.

HSE Questions and Answers

Q. Explain Fire Triangle?

- Fire Triangle is a diagram which represents the three components that creates a fire such as **Oxygen or Air**, **Fuel** and **Heat** (source of ignition).
- Absence of any of the components, fire would not occur.

Fig. Fire Triangle

Q. What is the different class of fire/types of fire?

Class of Fire: (As Per KOC)

Class A - Carbon based combustible materials (wood, rubber, paper, fabric, etc.)
Class B - Liquid (petrol, oil, thinners etc.)
Class C - Gases (acetylene, propane, LPG, Butane etc.)
Class D - Metals (Sodium, potassium, magnesium) require special extinguishing agent.
Class E – Fire involving energized electrical equipment as electrical cable, electrical motor etc.

Q. Which type of fire extinguisher is used for each class of fire?

TYPES OF EXTINGUISHERS & THEIR USE: (As Per KOC)

Symbol	Types/Class of fire	Type of Fire Extinguisher		
		Water	DCP (Dry Chemical Powder)	CO2 (Carbon Dioxide)
Class "A"	Carbon based (wood, rubber, paper, fabric etc.	Most suitable	May be used	May be used
Class "B"	Liquid (Petrol, oil, thinners etc.)	Not Suitable	Most suitable	May be used
Class "C"	Gases (Acetylene, propane, LPG, Butane etc.)	Not Suitable	Most Suitable	May be used
Class "D"	Metals (Sodium, potassium, magnesium) require special extinguishing agent	Not Suitable	Only Special DPC	Not Suitable
Class "E"	Energized electrical equipment as electrical cable, electrical	Not Suitable	Suitable	Most Suitable

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Q. What is fire extinguishing principle?

Fire extinguishment principle involves elimination one or more of the components forming a Fire Triangle.

Starving: The removal of fuel to the point so that nothing remains to burn.
Example: turn off valves.

Smothering: The removal of air or oxygen to point the so that combustion ceases.
Example: fire blanket, foam and sand.

Cooling: Cooling of fuel to the point so that combustion vapours are no longer produced, and temperature is dropped below ignition point.
Example: water spray etc.

Inhibiting the Flame Chain Reaction:

It is represented by fire tetrahedron shown below. In this method by arresting the chemical chain reaction in the flame zone, combustion process is terminated, e.g. introduce a Dry Chemical Extinguisher, inert agent etc.

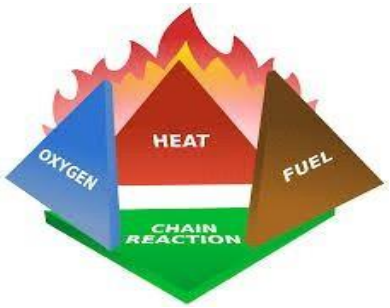

Fig. Fire Tetrahedron

Q. What is transmission of heat?

OR

What are the methods / modes for fire can spread?

Transfer of heat is responsible for initiation, continuation, and extinguishment of most fires.
Fire can spread by one or more of the following modes:-

Conduction: Heat from one body is transferred to another by direct contact.

Convection: Heat is transferred by a circulating medium either a gas or liquid.

Radiation: Heat is transferred from one body to another by heat rays a medium in between.

HSE Questions and Answers

Q. Define Near Miss, Incident & accident? What is different between Incident & Accident?

Near Miss: Near miss is an incident, which resulted in no injury or illness and / or damage (loss) to people, asset, the environment or Company reputation.

Example: A water tanker tilted.

Incident: Incident is any unwanted and unplanned occurrence/event which resulted or could have resulted to physical injury or death to person or damage to property or environment.

Or

An undesired event that has caused or could have potentially caused personal injury, illness and / or damage (loss) to assets, production or harm to environment or third party.

Example:

Accident: Accident is an undesired unplanned occurrence which resulted to an injury or death to person or damage to property or environment.

It is occurring due to unsafe acts or unsafe condition or combination of both.

OR

Accident is an unexpected, unplanned and unwanted occurrence which is occurred by unsafe act and unsafe condition or combination of both, which can be resulted in injury to person and damage to property and environment.

Example: A car collided with another vehicle.

Comparison between Incident & Accident:

All accidents are incidents but not all incidents are accidents.

Q. What are Unsafe Acts & Unsafe Conditions?

Unsafe Acts: Working without safety precaution or the act which can be create accidents.

OR

It is a violation of an accepted safety procedure which could have permitted to occurrence of an accident.

Example: Working at height without any fall protection.

Unsafe Conditions: The place where hazardous is hiding.

OR

It is a physical condition which could have permitted to occurrence of an accident.

Example: Working inside the deep trench without slopping or shoring.

HSE Questions and Answers

Q. What is the different Hazardous Area Classification? (as per KOC)

What you mean by Hazardous Area? What is Zone 0, 1 and 2.

Hazardous Area:

Hazardous area is the zone in which a flammable atmosphere may be present during normal operation or under abnormal conditions.

Classification of Hazardous Area:

Zone - 0: Zone in which a flammable atmosphere is continuously present or present for a long period. (Typically more than 1000 hours/year.)

Zone - 1: Zone in which a flammable atmosphere is likely to occur in normal operations. (Typically 10 to 1000 hours/year)

Zone- 2: Zone in which a flammable atmosphere is not likely to occur under normal operations and if it occurs, it will only exist for a short time. (Typically less than 10 hours/year)

Q. Incase of Fire, Accident, Gas leak or Explosion what you will do?

How you will safeguard your people at the site incase of any leak? Whom & How do you communicate this emergency.

- Inform to nearest fire station / Burgan fire station with clear details about the incident and emergency evacuation plan will be following up.
- All running equipment must put off.
- All people have to evacuate in the cross wind direction and calmly walk to the assembly area there on instructions will mount on the available transport, the transport will take all to a safe area.
- Every section will have a head count by section head or time keeper or check that any one missing or not.
- If anyone get hurt during explosion, gas leak, fire or accident, will be evacuated to the nearest medical center after giving first aid by qualified first aider or doctor.
- Emergency officer will give clear instructions of situation improved or all will be evacuated to a safe area.
- All work permits will become nullified during emergency automatically.
- During emergency an appointed Sr. staff/Sr. safety officer will take charge as an emergency officer.
- All will wait in the safe area until further instruction come from the emergency officer/KOC for either to return back to the work or to a safe area.

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Q. Enlist precaution to be taken prior to start the WELDING and GRINGDING works on the pipeline inside GC & why it is required?

OR

Explain Safety Precaution for a Hot Work? OR
What are the safety precautions you will take for a hot work?

Following precaution should be taken during **Welding / Hot Work**.

- Hot Work will start with a valid hot work permit.
- If it is inside GC or Refinery then need to cover the welding point with proper fire blanket.
- Frequent gas test to be carried out
- Wet the area with water and pressurized firewater hose to be kept near the hot work area.
- Combustible materials to be removed from welding point.
- Keep the certified and valid fire extinguisher near the hot work area.
- Trained and certified fire watcher should be present.
- Equipment, which will be used for hot work to be inspected before starting up the job.
- All welding machine must be connected with GFCI (Ground Fault Circuit Interrupter) or ELCB (Earth Leakage Circuit Breaker) and approved spark arrester.
- All welding machines must be ground with static-earthing device.
- All cable must be properly insulated and electrode holder, plugs and sockets must be in good condition.
- The equipment or pipe, spool should be supported on a secured and firm base during welding or grinding.
- All valves, flanges, drains, canals etc. where gas leaks or presence of flammable atmosphere is possible should be covered.

Q. What are the Safety Precautions taken *GAS WELDING & CUTTING*?

- Any hot work will start with a valid hot work permit.
- Frequent gas test to be carried out.
- In a gas welding or cutting operations, the oxyacetylene flames shall be ignited by the lighter specially designed.
- The pressure regulators and gauges shall be suitable and in good working condition.
- The cylinder valve must be closed before the regulator is removed.
- Flash back arrestors should be fitted both end with the hoses to prevent flash back.
- The adequate ventilation must be provided to expel toxic gases/fumes, if activities carried out inside a tank / vessel / any confined space.

- All valves, flanges, drains, canals etc. where gas leaks or presence of flammable atmosphere is possible should be covered.
- Combustible materials to be removed from welding point.
- Valid Fire Extinguishers and Fire Watcher should be provided.
- When need to cover the welding point with proper fire blanket.
- When necessary, wet the area with water and pressurized firewater hose shall be provided.
- Equipment, which will be used for hot work to be inspected before starting up the job.
- All hose and cable, plugs and sockets must be in good condition.

Q. What are the welding and cutting hazards?

Welding & Cutting HAZARDS:

- Risk due to toxic gas & fumes generated while welding or cutting.
- Fire or explosion started by flame, sparks and hot material from the activities.
- Electrical shock from arc welding equipment.
- Burn hazard due to heat generated while welding or cutting.
- Weld bead particulars or slag entering unprotected eyes during chipping.
- Inhalation of welding fumes.
- Falling Gas cylinders.
- Radiation from UV and Infra-Red (flash eye).

Q. What will be your action if someone informs you about accident?

- Ask him the location of the accident and the details.
- After reached the location analyze the situation, if someone get hurt during accident must be evacuated to the nearest medical center after giving first aid by a qualified first aider or doctor.
- Report to near fie station / Burgan fire station with clear location and details of the accident.
- Report to client HSE Specialist and concerned project manager.
- Investigate the accident and prepared an accident report with attached sketch and supporting documents and submit to client HSE Dept.

If the accident is major like Explosion / heavy fire / heavy gas leak then seek help from nearest fire station / Burgan fire station and follow up the evacuation procedure

HSE Questions and Answers

Q. What is the Pyrophoric Scale?

- Pyrophoric scale is actually Iron Sulphide (FeS_2) which develops inside pipeline or piping system. It will readily ignite when exposed air/oxygen (Exothermic Reaction – i.e. heat releasing).
- Hydrogen Sulphide (H_2S) or any Sulphur compound when it is react with iron it will form PyrophoricIron Sulphide.
- It is highly flammable even exposure to the air. The best way to handle is to douse it with water and keep it thoroughly wetted until safe disposal.
- In pipelines or equipments which carry gas or liquid and which contains Hydrogen Sulphide (H_2S), Pyrophoric Scale or Iron Sulphide (FeS_2) may be present.

Q. What is the MSDS?

Material Safety Data Sheet is detailed information about the physical and chemical characteristics of the chemicals as well as the health, safety, fire, reactivity and environmental hazards and its precautions. It is provided by manufacturer.

Q. What is the JSA?

- JSA stand for Job Safety Analysis.
- It is to be completed before start of any new job.
- It clearly defines the specific job, equipments and tools to be used, specific hazards of the job and preventive measures to be taken.
- It is to be filled by supervisory staff and discussed with HSE Dept.
- It is to be signed by all concerned to confirm that everyone involved does know about the job and how to do it in safe way.

Q. What is EOD and what will be your responsibility if an EOD identified?

EOD is Stand for Explosive Ordinance Disposal. Incase of an EOD identified or an unidentified object find, mark the area so as to relocate it, keep away all workers from the particular area. If possible detail a watchman and inform respective area fire station with clear details. Stop all activities at the location until cleared by KOC Ordinance Disposal Squad.

HSE Questions and Answers

Q. Define Lock out Tag out (LOTO) System?

- Lock out & Tag out is a process to block the flow of energy from the source and it will locked with lock system or padlock for not restore the energy and these should be tag on it, the tag will be as warning „do not operate".
- Locks and tags will be normally be removed only by the person who installed them whenever possible.
- Before lockout and tag out make sure that a valid isolation permit being obtained.

Q. Define Chemical Hazard Identification Tag?

- Chemical hazard Identification Tag or Hazardous Material Classification Tag is a warning tag to inform that how much hazardous is the material contain e.g. fire, health, reactivity or specific hazard.
- It is color coded, **Red** for fire, **Blue** for health, **Yellow** for reactivity and **White** for specific hazard like oxidizer, alkali, acid and corrosive etc.

Q. What are the general precautions to be taken before and during using an *ABRASIVE WHEEL*?

Precautions - Abrasive Wheel:

- Ensure the spindle speed doesn't exceed the maximum speed marked on the wheel.
- Ensure fit the wheel on the spindle freely.
- Tighten the spindle nut enough to hold the wheel in place without distorting the flange.
- Do not stand in front of the rotated wheel.
- Provide protective guard for a moving abrasive wheel and maintain proper alignment with the wheel.
- For any bench mounted abrasive wheel, the wheel rest should be adjusted as close as practicable to the abrasive wheel, which shall be firmly secured.
- Before mounting inspect closely for damage, perform sound-test or ring-test to ensure free from cracks/defects.
- Don't adjust wheel while it's rotating and disconnect tools when changing the wheel.
- Don't use expired abrasive wheel and removed damage/crack wheel and tag it "do not use".
- Must be used eye and face protective device (goggles, face shield etc.).

- Wear the suitable respiratory protection also in case abrasive wheel generates dust.
- A sign shall be posted near all fixed abrasive wheel.

Q. What is safety precaution to be taken prior to start & during the WORK AT HEIGHT & why it is required?

- The work is properly planned, organized. Appropriately supervised and carried out ensuring safety of workers and integrity of worksite.
- The worksite including its access as well exit is safe with necessary protection against fall from height.
- Similarly the workers to be deployed for work at height are trained and aware of potential hazards.
- PPE, appropriate fall arrest system such as Safety Harness, Safety Nets etc. shall be used to protect the person from fall.
- The personnel working at height must use appropriate & approved Full Body Safety Harness and attached to a secure anchorage.
- All the straps of safety harness shall be securely tightened to the body parts.
- The tools and equipment to be used at height must be kept properly securedto prevent its accidental fall or tripping hazard.
- The area in the vicinity of work at height should be barricaded and danger notice posted to alert the personnel.
- **Man Basket:** Workers should keep all body parts inside the man basket while it is being lifted or positioned. Workers must wear a personal fall arrest system, and Helmet with chin strap must be worn at all times.
- **Sloping Roofs:** Employee worked in roofing activities on slope roofs with unprotected sides and edges 6 feet (1.8 meters) or more above shall be used appropriate Safety Harness, Safety Net and Guardrail or a combination of these.

Q. What are the safety PRECAUTIONS to be taken while performing LIFTING OPERATION?

- The load is clear of any obstruction
- The load is securely slung (use tie ropes)
- The security of the load is to be reconfirmed once the load is raised a few inches.
- The crane is not used to drag the load or pull the slings beneath a few inches.
- No movement is allowed under the suspended load.
- Barricade the swing radius of the crane.
- Never sling different size of tubular together

- The crane hook is in central position over the load.
- All equipment must be inspected by third party and validity of inspection must be checked.
- Daily inspection sheet of cranes must be always available with crane operated.
- SWL of the crane and hook shall be marked and highlighted.
- Fire extinguisher of approved type & capacity.
- Crane hook secured prevent swinging action in transit .
- A calibrated SWL indicator &crane capacity chart prominently displayed in the cabin.
- All loose material is to be removed from the top of the load.
- Slings is protected from sharp edges by using suitable packing
- Hooks used on lifting equipment should be fitted with safety device to prevent the load or sling displacement for hook.
- Do not used wire rope slings if it is kinked, crushed, frayed or corroded.
- Slings must never shortened by tying knots in them or by wrapping round a crane hook.

Q. What are the Potential HAZARDS while performing LIFTING OPERATION?

- Accidents hit or crush by hanging load.
- Falling objects
- Collapse of lifting equipment due to overload.
- Overturning of the crane.
- Failure of lifting gears such as wire ropes, hooks, shackle, eyebolts, chain etc.

Q. What is Rigging & Slinging?

Rigging and Slinging is a part of mechanical handling activity which involves lifting and shifting of heavy material through the safe use of equipment, machinery or devices such as crane, wire rope, hooks, shackles, chain pulleys etc.

Q. Explain about Compress Gas Cylinders?

Cylinders testing:

Contractors may be required to provide proof that compresses gas cylinders have been tested in excess of their normal maximum pressure when filled.

Cylinder connections:

Compresses gas cylinders shell is equipped with connections complying with compresses gas cylinders valve outlet and inlet connections –ANSI B 57.1-1975, or an equivalent standard (copy available for examination at the technical library).

Storage of cylinders- general:

The following requirement apply to the storage of Compresses gas cylinders; i.e. cylinders which do not have a gauge in place.

Cylinders shall be shaded, if stored outside.

Cylinders stored inside:

a) Well –protected, well-ventilated, dry location.

b) At least 6m (20ft) away from combustible

Q. What is dead man switch and what is the use of it?

Dead man switch is a control switch, which is connected with sand blasting nozzle (gun) to control the flow from sand blasting nozzle (gun) while sand blasting. In case the hose nozzle loss from the sand blaster hands automatically the system will cut off and the individual and the property will be safe.

- The nozzle shell is electrically grounded to prevent static electrical discharge or shocks to the operator.
- Air line spray guns: airline spray gun operates at very high pressures: 140.6 to 170Kg/Sq Cm (2,000 to 2,500 Psi). They are extremely hazardous, since the jet is strong enough to slice through human flesh. The control switch or lever may have a catch device to hold switch or lever in the ON position; however, it shell be so adjusted that if it is dropped from height of 61 Cm (2Ft.) to a soil surface the device will immediately disengage, there by shutting of the gun.
- The spray gun shall also be equipped with a safety catch that shall be activated when the gun is not in use.

Q. Explain PPE?

- Personal Protective Equipment is indented to protect employees from hazards. There are specific protective equipments for specific job. PPE will protect you only if used it in the intended way.
- PPE is working barrier between harm and human body.

Q. What is Housekeeping?

- A place for everything and everything in its place. Before start the job, during the job and after completion of the job housekeeping should be done.
- Waste materials and rubbish are a fire and accident hazard.

Q. What is Non-Hazardous Waste?

Unwanted materials / substances other than the hazardous. They could be in the form of a solid, sludge, slurry and liquid.

The exceptions are:-

- Materials sold for reuse/reprocessing
- Surplus/Expired materials that are returned to the manufacturer or supplier

Q. What is Hazardous Waste?

Any waste (solid, sludge, slurry and liquid) which is either: combustible, explosive, inflammable, corrosive, reactive or toxic.

Q. What is Reduction Minimization?

Process of reducing the quantity of waste produced through the review of operational practices, better inventory control and optimal use of raw materials.

a. Re-use :

The reuse of a material on more than one occasion

b. Recycling :

The reprocessing of waste into the same or a different product. Typical recyclable wastes include oils, glass, paper, plastics, etc.

c. Recovery :

The process of obtaining materials or energy values from collected waste for use or reuse.

Q. What is defensive driving?

Defensive driving is

A. Driving to prevent accidents, in spite of the incorrect actions or others or adverse weather conditions.

B. Anticipate driving hazards and know how to protect yourself from them.

C. Be alert while driving by keeping your mind free of distractions and your attention focused on driving. Alertness involves watching and recognizing accident – causing factors instantly.

D. The professional has foresight and ability to recognize the traffic situations as far ahead as possible.

E. The driver must anticipate traffic problems that are likely to develop and decide whether these developments could be dangerous.

F. As a defensive driver every one must operate their vehicle in a manner to avoid contributing to an accident or being involved in a preventable accident.

G. To be a good driver you should respect all traffic laws and be courteous to other.

HSE Questions and Answers

Q. Write in detail about construction waste management and safe disposal.

The HSE officer responsibility as following.

- Good housekeeping is to be maintained during day-to-day operations.
- All waste streams that are generated in the project areas to be identified, classified and entered in a waste register.
- All disposal sites used are to be designed and approved by KOC.
- The subcontractor in charge of waste management and disposal must be licensed and approved.
- All environmental incident and accident spillage or discharges must be properly managed and documented.
- All waste materials must be disposing in a approved area by Kuwait government.

Q. Enlist 5 main responsibilities of PERMIT APPLICANT.

Permit Applicant Responsibilities:

1. All the required information as stipulated in the permit must be entered before the permit is submitted for approval & authorization.
2. Any required preparatory work must be stipulated in the permit application.
3. All personnel under his responsibility must be advised of their responsibility under work permit system.
4. No job can begin until he is satisfied that the worksite supervisor understands his responsibilities under work permit system.
5. The safety gears and appliances required for the work must be available.

Q. Enlist 5 main responsibilities of PERMIT ISSUER.

Permit Issuer Responsibilities:

1. All hazards associated with the proposed work have been identified.
2. Before any work begins the work site is safely prepared, examined and all specified precautions have been taken.
3. Work permit that may interact or effect on another are cross-referred clearly.
4. The work is examined to ensure that it is in safe & acceptable condition:
    - When work is suspended.
    - Before re-starting the work.
    - When retiring to normal operation.
5. The shift change hand-over is properly followed and permit endorsement and transfer of responsibility have been completed.

HSE Questions and Answers

Q. Enlist 5 main responsibilities of WORK SITE SUPERVISOR.

Permit Work site Supervisor Responsibilities:

1. He was detailed working knowledge of procedures related to his work activity.
2. He does not start any job requiring a work permit until it is authorized and issued.
3. He understands the limitations and restrictions of the work permit in order that the work party may proceed safely.
4. All members of the work party adhere to safe working practices and are fully conversant with the limitations, restrictions and hazards involved.
5. All precautions specified in the work permit are taken.

Q. What is the minimum height of the elevation requires the need of fall protection? (Safety harness, Safety belt etc.)

1.8 Mtr. or 6 ft.

Q. What are the fall protection systems?

- Safety belt
- Safety harness
- Lifeline
- Safety Net
- Guard rail system

Q. In which situation a chin strap for Helmet is compulsory?

High windy times & Working at height.

Q. What is the P.P.E. used for working personnel near or above water?

Life jacket

Q. What are the criteria for selection of the respirators?

- Physical, chemical & Toxic properties of the atmosphere
- Type of contaminant
- TLV
- Respiration hazard
- IDLH (Immediate Dangerous to Life/Health) of Concentration
- Eye irritation potential

Q. What is SCBA?

- Self Contained Breathing Apparatus.

HSE Questions and Answers

Q. What are the contents of SCBA?

- Compressed air cylinder
- Full face piece
- Air supply hose
- Pressure regulator
- Low pressure alarm
- Pressure gauge

Q. What are the Escape Respirators?

A. Air Purifying Respirators (Filter/Canister Type)

B. SCBA(Self contained Breathing Apparatus)

Q. What is SCUBA?

Self Contained Underwater Breathing Apparatus.

Q. What is the function of the Escape Respirators?

Providing sufficient time to a person for escape from a suddenly occurring Respiratory hazards.

Q. What is the function of Air purifying Respirators?

It remove the contaminant from the air by absorbing and or filtering.

Q. What's the normal rating for SCBA?

3 Minutes to 60 Minutes.

Q. Air purifying respirators can be used in Oxygen deficient atmosphere? Say 'Yes or No.

No If „ no „ Ask Why? Ans: It will only cleans the air , so when oxygen deficient atmosphere ,it can't supply the additional air to compensate.

Q. When performing the grinding work by hand grinding M/C ,What are the hazards will u expect?

- Eye injuries due to flying particles(metal chips)
- Wheel bursting
- Electric shock
- Cloth caught

Q. What are the P.P.E. required for fabrication work?

- Cover all
- Helmet
- Safety shoe
- Hand gloves
- Face shield/Goggles.

Q. What is intrinsically safe concept?

- The electrical equipment, which will be used in the hazardous atmosphere. Must be intrinsically safe and certified.
- Intrinsically safe electrical equipment‟s spark will not expose in the atmosphereit will be confined in the equipment itself.

Q. What are the parameters of Risk management?

1. Identify
2. Evaluate
3. Recover
4. Mitigate
5. Prevent

Q. Describe 2 types of Co_2 system and their applications?

A. CO2 is contained in a pressure cylinder and is released by a squeeze trigger mechanism through a horn type applicator, which is using for electrical fire.

B. Plain water expelled by pressure released from a CO2 cartridge, which is using for normal fire.

Q. What is flash back arrester?

It is a valve, which is protecting cylinders from backfire. It calls NRV (non-return valve).

Q. Define HAZAN, QRA AND HAZOP.

HAZAN	-	Hazardous Analysis
QRA	-	Quantified Risk Analysis
HAZOP	-	Hazardous Operation
HAZCH	-	Hazardous Chemical
HAZAMAT	-	Hazardous Material

HSE Questions and Answers

Q. What is your understanding about HSE awareness? Write in full details.

Promoting and disseminating the health safety and environment programs.

Q. How do you implement HSE during construction through commissioning of the project and on what basis?

To ensure that all major hazards which can cause harm to people environment or property have been identified, suitable control and recovery measures are implemented.

Basis: - Enforcing safety rules and procedures.

Q. What is your concept of safety review of documents and drawings?

The safety review of documentation is to decrease the system operation and serve as a permanent reference to the implementation to avoiding information – Dependent or Individuals.

Q. What is SHORING?

Shoring is a support to prevent trench collapsing. If side of the trenches is unstable, soft or chances to collapse then shoring is essential. It is to be made by *COMPETENT PERSONS*.

Q. What is Fire?

Fire is a chemical reaction of oxygen, heat, fuel and burning material, met together will start the fire.

Q. What is Hazard?

Hazard is the potential to cause harm.

Q. What is Risk?

Chances of personnel and physical loss.

Q. What is purpose of safety?

To save the life and protect the property.

Q. What is the Isolation?

Temporary disconnect from the sours.

Q. What is the maximum allowable limit for LEL?

For Hot Work less than 1 preferable „0" and for Cold Work up to 20

HSE Questions and Answers

Q. Flammable range of Ammonia?

- For Ammonia (NH_3) LEL – 15% and UEL – 28% by volume in air.
- Auto Ignition Temperature (AIT) is 651.57C (1204 F) – Gas.
- Threshold Limit Value (TLV) – 25 PPM.
- The Short Time Exposure Limit (STEL) – 35 PPM.

Toxicity of Ammonia:

- It is extremely irritating to the eyes, nose, throat and lungs and all moist parts of the body.

Q. Explosive rang for H_2S?

- LEL-4.5% UEL-45.5%
- Auto Ignition Temperature (AIT) – 260C (500 F)
- Threshold Limit Values (TLV) exposure is 10PPM.

Q. Function of Insulation?

Insulation will keep the heat of product, without insulation oil will be wax.

Q. What is pipeline/ what is the purpose of pipeline?

It is a media to transport oil or gas from one location to another location.

Q. What are welding and cutting?

Welding is a process in which two or more metals are joined together with application of heat whereas cutting is the reverse.

Q. What is the Work at height?

Work at height is an activity at an elevated location of more than 1.8 meters (6 feet) high from the working ground level.

ABBREVIATIONS

RDI	–	Restricted Duty Injury
IDI	–	Industrial Disable Injury
INDI	–	Industrial None Disable Injury
CSM	–	Construction Safety Manual
CSP	–	Construction Safety Plan
AC	-	Alternating Current
DC	-	Direct Current
CFR	-	Code of Federal Regulations (USA)
IFR	-	Inherent Fire Resistant
kPa	-	Kilopascals
Bp	-	Boiling Point
psi	-	pounds per square inch
PPM	-	Parts Per Million
LEL	-	Lower Explosive Limit
BA	-	Breathing Apparatus
CGI	-	Combustible Gas Indicator
UV	-	Ultraviolet
IR	-	Infra Red
CFC	-	Chlorofluorocarbon
CPR	-	Cardio Pulmonary Resuscitation
CSR	-	Chemical Safety Report
MoC	-	Management of Change (in KOC Procedure)
ANSI	-	American National Standards Institute
NFPA	-	National Fire Protection Association
NIOSH	-	National Institute for Occupational Safety & Health
OSHA	-	Occupational Safety and health Administration
BS EN	-	British Standard European Norm
HSEMS	-	HSE Management System
HSE	-	Health, Safety & Environment
JSA	-	Job Safety Analysis
EOT	-	Electrical Overhead Traveling Crane
EWTP	-	Effluent Water Treatment Plants

GC	-	Gathering Centre
BS	-	Booster Station
EPF	-	Early Production Facilities
HAC	-	Hazardous Area Classification (as per KOC)
PMC	-	Project Management Consultant