OGDCL

SAFETY HANDBOOK

For Oil & Gas Well Drilling and Servicing Operations

This handbook is based on API Recommended Practices and is intended as reference only. It is not all encompassing. Ask your Location HSE Representative/ Coordinator for more detailed information. The specific HSE Management System procedures are available in the latest revision of OGDCL's Integrated HSE System Manual.

Occupational Health, Safety, Environment & QA/ QC Department

Occupational Health, Safety, and Environment

Policy Statement and Commitment

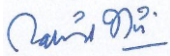
As a responsible Corporate Citizen, OGDCL attaches greater significance to HSE system with a view to promoting a culture and attitude of compliance for the safety & wellbeing of our manpower, community and the environment. We resolutely believe that responsibility for health, safety, and environment cannot be delegated, it is a shared responsibility across our company.

We believe in good HSE performance that can ultimately contribute to business success. By supplying energy, we fundamentally support economic development and help to improve quality of life of people. Our activities also generate jobs, investment, infrastructure and revenues for governments and local communities. In carrying out all our activities, hence we ensure welfare of the indigenous communities, protection of ecosystems and safety of our workforce.

As we continue our exploration and production activities basing our growth on a sound foundation of technical and financial prudence, we are supporting health, safety, and environment initiatives by:

Best Practices & Culture	▫ We shall promote a positive culture based on improving HSE performance.
Legal & Regulation Compliance	▫ We shall commit to HSE excellence in all activities wherever we operate and comply with relevant laws and regulations, and adhere to applicable standards and procedures.
Safe Workplace	▫ We shall endeavor to take every reasonable and practicable step to eliminating hazards, practices and behaviors that could cause accidents, injuries or illness and damage to nature & properties.
Ethical Responsibility	▫ We shall take resolute measures to reinforce that all employees share an ethical responsibility in embracing no smoking and no drugs policy.
Environment	▫ We shall take proactive steps and strive towards conservation of the environment, implementing controls to eliminate pollution and environmental harm.
Resource & Engagement	▫ We shall provide training and resources for workforce to maintain safe systems of work.
Emergency	▫ We shall ensure that Location Emergency Response Plans are in place to deal with and recover from emergencies and shall notify timely all relevant stakeholders during the emergencies.
Continuous Improvement	▫ We shall Integrate HSE management into all aspects of the organization by leveraging on people, process and technology.
Lines of Responsibility	▫ We shall employ contractors who aspire to the high HSE standards at all times, and recognize that HSE is everyone's responsibility.
Results	▫ We shall continue to address the impacts of our operations by focusing on the Leading Indicators. We shall report publicly and annually on HSE performance, measured against objectives and targets.

We strive to be good Corporate Citizen in every community in which we operate. Through observance and encouragement of this policy, we aim to assist in protecting the environment and the overall wellbeing of all of our stakeholders, specifically, our employees, clients, shareholders, subcontractors, and communities.



Managing Director/ CEO

We hereby uphold our commitment to HSE Policy.

ED Production 17/5/2016

ED Petroserv 17/5/16

ED Services

ED Exploration 17/5

ED Finance 18/5/16.

ED JV

ED HR/Admin 17/5/16

The following safety precautionary guidelines will be strictly enforced to ensure the safety of our people at all Locations and our communities. Everyone who works for or on behalf of OGDCL is responsible for their own safety and the safety of those around them; however, senior management is accountable for timely communicating, training, implementing, and devising system of auditing for these precautionary guidelines to assure continuity in the compliance and performance.

Important:-

Although embedded in each of these precautionary guidelines, it is important to emphasize that:

- Work will not be conducted without a pre-job risk assessment and a safety discussion appropriate for the level of risk.
- All persons will be trained and competent in the work they conduct.
- Personal protection equipment will be worn as per risk assessment and minimum site requirements.
- Emergency response plans, developed through a review of potential emergency scenarios, will be in place before commencement of work.
- Everyone has an obligation to stop work that is unsafe.

Workforce Responsibilities:-

- It is the responsibility of every workforce member to read this Safety Handbook.
- It is the responsibility of every workforce member to comply with the precautionary guidelines in this Safety Handbook.
- It is the responsibility of every workforce member to work safely and to promote positive safety culture.
- It is the responsibility of every workforce member to attend and participate in scheduled safety meetings.
- It is the minimum responsibility of every workforce member to report all hazards, unsafe work procedures and conditions to the Location InCharge and HSE.
- It is the responsibility of every workforce member to report all accidents and nonconformities to the Location InCharge and HSE.

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ANNEXURES

DEFINITIONS

acidizing: The act of pumping an acidic solution into a wellbore to remove materials from the perforations, pipe, and walls of the producing formation or pumping the solution into formations to improve permeability.
adequate ventilation: Adequate ventilation, as used in this document, is for the prevention of fire and explosions. Adequate ventilation is ventilation (natural or artificial) that is sufficient to prevent the accumulation of significant quantities of vapor-air mixtures in concentrations above 10% of their lower explosive limit (LEL).
annular space: Space surrounding pipe in the wellbore. The outer wall of the annular space may be open hole or pipe.
approved: Sanctioned, endorsed, accredited, certified, or accepted by a duly constituted and recognized authority or agency.
authorized person: A person assigned by an employer to perform or supervise the performance of a specific type of duty or duties at the work site.
back up: Refers to the act of "backing up" or preventing rotation of one section of pipe or rods while another is screwed out of or into it. Also applied to screwing nuts on or off bolts. A backup wrench refers to any wrench being used to hold the pipe, rods, or bolt. Backup tongs refers to the pipe tongs suspended in the derrick and used to hold a section of pipe while another section is screwed out of or into it by use of other tongs. The backup man is the crew member who operates the backup tongs. The backup position refers to the workstation of the backup man.
blocks, crown, and traveling: The fixed upper and movable lower blocks, respectively, of the block and tackle assembly on a rig that raises and lowers the drill string or tubing.
blowout: An uncontrolled flow of well fluids and/ or formation fluids from the wellbore or into lower pressured subsurface zones (underground blowout).
blowout preventer (BOP): A device attached to the wellhead or Christmas tree that allows the well to be closed in with or without a string of pipe or wireline in the borehole.
blowout preventer remote control: A set of control tools that can be used to actuate the blowout preventer from a position some distance away from the blowout pre-venter, usually the rig floor or accumulator.
breaking out pipe: Operation of unscrewing a pipe section.
bypass: Usually refers to a pipe connection around a valve or other control mechanism. A bypass is installed in such cases to permit passage of fluid through the bypass line while adjustments or repairs are made on the control that is bypassed.
casing: Pipe installed in the wellbore and usually cemented in place to retain the borehole dimension and seal off hydrocarbon and water-bearing formations.
a. surface casing: The outside and first pipe string installed in the wellbore, except for drive pipe or conductor pipe, to seal off surface sands; provide support for blowout prevention equipment and blowout protection; prevent loss of circulation while drilling deeper; and to protect fresh water sources. This casing is normally run to a depth below the base of the fresh water zones and cemented in place.
b. protective (intermediate) casing: A pipe string extending to the wellhead and installed inside of surface casing in wells of such depth without which drilling fluid cannot be balanced because of simultaneous lost circulation and high pressure entry of another zone, or in regions where abnormal pressure gradients are encountered.
c. production casing: The full length pipe string extending between the wellhead

and an elevation at or below the producing formation, inside of protective or surface casing, and cemented in place to seal off productive zones and water-bearing formations.
d. liner: The partial length pipe string extending between the bottom of the borehole to an elevation above the bottom of the previous casing string. The liner may perform the same function as protective or production casing in sealing off producing zones and water-bearing formations. Liner may or may not be cemented in place. This term can also refer to a partial length pipe string set inside casing as a patch string.
e. tubing: Pipe installed in the wellbore inside casing strings and extending from the wellhead to a depth below, at, or above a producing, disposal, or injection formation. This is the pipe through which the produced or injected fluids flow.
catline, cathead: Catline is a line powered by the cathead, which is a concave, rotating, pulley-type device mounted on the end of the cat shaft of the drawworks. Cat-lines are used to lift or pull equipment around a rig.
catwalk: Elongated platform adjacent to the rig floor where pipe is laid out and lifted into the derrick. The catwalk is connected to the rig floor by a pipe ramp.
cellar: Excavation around the wellhead to provide space for items of equipment at the top of the wellbore.
cementing: Making cement into a slurry and pumping it into a wellbore to perform functions such as supporting casing, isolating formations behind casing, protecting fresh water sands, and sealing perforations in casing.
christmas tree: The valves and fittings assembled at the top of a completed well to control the flow of hydrocarbons and other fluids.
circulate: Cycling fluid from the surface through the pipe and back to the surface through the annular space.
combustible liquid: Any liquid having a flash-point at or above 100°F (37.8°C).
competent person(s): A person having the necessary qualification and experience, in particular process or type of operation and equipment to which the job relates, to render him capable of the work involved.
conductor pipe: A relatively short string of large diameter pipe that is set to keep the top of the hole open and provide a means of returning the upflowing drilling fluid from the wellbore to the surface drilling fluid system until the first casing string is set in the well. Conductor pipe may also be used in well control. Conductor pipe is usually cemented.
contractor: Any person or company that contracts to perform all or any part of oil and gas well drilling or servicing.
critical equipment: Equipment and other systems determined to be essential in preventing the occurrence of, or mitigating the consequences of an uncontrolled event. Such equipment may include vessels, machinery, piping, blowout preventers, wellheads and related valving, flares, alarms, interlocks, fire protection equipment, and other monitoring, control, and response systems.
deadline: The end of the drilling line that is not reeled onto the hoisting drum of the rig. This end of the drilling line is anchored (usually to the derrick substructure) and does not move as the traveling block is hoisted, hence the term deadline.
derrick (mast): The steel lower component of a drilling or well servicing rig that supports the crown block, traveling block, and hoisting lines. Derricks and masts may be stationary structures normally requiring dismantling and disassembly when moved from location to location, or may be portable with the capability of being laid down and raised to and from ground level fully assembled.
derrickman: Person whose work station is usually up in the derrick while pipe or rods are being hoisted or lowered into the hole.
driller: First line supervisor whose main duties are to control the activities of his crew and to train those crew members in the proper way to perform their

assigned tasks. The driller is responsible for operation of the drilling and hoisting equipment. This person is also referred to as the "crew chief" or "rig operator" in well servicing operations.

drilling (hoisting) line: The wire rope used in the rig's main hoisting system.

drilling out: Refers to drilling and removal of material that normally remains in the casing or wellbore after cementing.

drilling rig: Equipment and machinery assembled primarily for the purpose of drilling or boring a hole in the ground.

drill pipe: The heavy seamless tubing used to rotate the drill bit and circulate the drilling fluid. Usually in 30-ft lengths, the joints of drill pipe are coupled together with special threaded connections called tool joints.

drill stem: The entire drilling assembly from the swivel to the bit composed of the kelly, drill string (work string), subs, drill collars. and other downhole tools such as stabilizers and reamers. This assembly is used to rotate the bit and carry the drilling fluid to the bit.

drill stem test: A test taken by means of special testing equipment run into the wellbore on the drill string (work string) to determine the producing characteristics of a formation.

drill string: Several sections or joints of drill pipe joined together. May also refer to sections or joints of threaded tubing or casing joined together to be used for drilling.

drive pipe: A relatively short string of large diameter pipe driven or forced into the ground to function as conductor pipe.

electrical classification of areas: Any place in which an explosive atmosphere may occur in quantities such as to require special precautions to protect the safety of workers → locations are classified according to *API RP 500: Classification of Locations for Electrical Installations at Petroleum Facilities; or API RP 505: Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2.*

elevators: A mechanical device attached to the traveling block that latches around and supports the pipe during hoisting or lowering operations

external guylines: Lines which provide stability and run from some point in the derrick, mast, or pole to ground anchors, or to a special substructure or derrick base that provides a substitute for ground anchors.

flame arresters: A device for preventing the passage of flame into or out of any apparatus, vehicle, or equipment.

flammable liquid: Any liquid having a flashpoint below 100°F (37.8°C).

floorman (rigman): Member of the rig crew whose work station during hoisting is on the rig floor. Also performs numerous other operating and maintenance duties as directed by the supervisor. May also be referred to as rotary helper, roughneck, driller's helper, or well puller.

freezing operation: Creation of a plug by freezing a liquid in a pipe or fitting to confine the pressure while removing defective or inadequate equipment downstream of the plug.

full body harness: Straps which may be secured about a person in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with means for attaching it to other components of a personal fall arrest system.

ground anchor (deadman): Static holding device installed in the ground separate from the rig structure and to which guyline(s) may be attached.

guarded: Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers or casings, barrier rails, or screens to eliminate the possibility of accidental contact with or dangerous approach by persons, animals, or objects.

guyline: Wire rope(s) that is attached to elevated structures, such as derricks or mast, and ground anchors for stability.
guyline anchors: The ground components of the guyline system to which the wire rope(s) is attached.
hazardous substance: Any substance that, by reason of being explosive, flammable, toxic, corrosive, oxidizing, irritating, or otherwise harmful, has the potential to cause injury, illness, or death.
hole: Common term that usually refers to the well-bore.
hot oil treatment: The act of heating oil and pumping it into the piping, tubing, casing, or formation to remove paraffin and asphaltines.
hot tapping (pipe tapping): The act of drilling a hole through the wall of pipe that is under pressure. A special saddle is used to attach a valve and lubricator to the pipe.
hydraulic fracturing: The act of pumping fluid(s) into a wellbore and into a specific formation to induce fractures. The fluid usually carries some type of proppant material, such as sand, to keep the fracture open after pumping ceases.
kelly: The square, hexagonal or other shaped steel pipe connecting the swivel to the drill pipe. The kelly moves through the kelly bushings, rotary table and rotates the drill string.
kelly swivel valve (kelly cock or upper kelly valve): A valve located between the kelly swivel and the kelly, used for well control when the kelly is in the hole. It works like a check valve when engaged.
lanyard: A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline or anchorage.
liner: See *casing*.
load guylines: Stabilizing guylines that run from a point on the mast, derrick, or pole to a point at or near the base supporting the mast or pole or to ground anchors. (Sometimes referred to as "internal guylines" when attached to the base.)
location: The point at which a well is to be drilled. Also referred to as "wellsite."
lockout/tagout: A process to specify that equipment is out of service until locks and/or tags are removed by the authorized person.
lubricator: A fabricated length of tubular pipe equipped with a packoff and bleed valve that is installed to provide access while working on a well under pressure with wireline or other tools and equipment.
making a connection: Act of screwing a section of pipe or rods onto the string suspended in the wellbore.
making a trip: Consists of hoisting (pulling) the pipe or rods to the surface and lowering (running) the pipe or rods into the wellbore.
making up a joint: Act of screwing a joint of pipe into another joint.
mast: See *derrick (mast)*.
monkey board: Platform on which the derrick-man works during the time a trip is being made. Also referred to as the tubing board or racking board on well servicing rigs.
mud bucket (mud box): Device used to enclose pipe connections to deflect fluid released when a joint or stand of pipe containing liquid (wet string) is unscrewed.
NFPA: National Fire Protection Association.
operator: Lease owner or his designated agent who is responsible for the overall operation of the lease.
open hole: Uncased part of the wellbore.
perforating: Making holes in pipe, cement, or formation at desired depths usually

performed with an explosive device utilizing bullets or shaped charges.
personal fall arrest system (PFAS): A system designed to provide protection to a person from falls. The PFAS should consist of an anchorage, connector and a synthetic webbing full body harness which may include a lanyard and a deceleration device.
pipe racking board guylines (tubing board guylines): Lines (guylines) which run from the racking board to ground anchors; or a special substructure or base that provides a substitute for ground anchors.
pole mast: Structure consisting of one or more tubular sections, telescoping or not telescoping, that are the load-bearing members. The structure, when erected to working position, usually requires guylines. It may be attached to a carrier, skid base, or substructure.
production casing: See *casing*.
protective (intermediate) casing: See *casing*.
pumping unit: Surface equipment used for the purpose of mechanically lifting fluids from a well.
qualified person: A person who, by possession of a recognized degree, certificate, or professional standing, or who by knowledge, training, or experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter or the work.
rabbit: An instrument or device that is dropped, pulled, or pushed through a section of pipe to ensure that it is free of obstruction.
racking pipe or rods: Act of placing stands of pipe or rods in an orderly arrangement in the derrick.
rated working pressure: The maximum internal pressure that equipment is designed to contain and/or control. Working pressure is not to be confused with test pressure.
reverse circulation: Reverse circulation occurs when fluid is pumped down an annular space and returns to the surface through the tubular forming the inner wall of the annular space. This is opposite of normal circulation wherein fluid is pumped down the inner tubular pipe and returns up the annular space.
rigging up: The on-site erection and connection of the components in preparation for drilling or well servicing operations.
rod (sucker rod): A length of steel, aluminum, fiberglass, or other suitable material, a number of which are screwed together to make up the mechanical link (rod string) from the surface pumping unit to the pump in the well.
safety valve (stabbing valve): A full opening valve available for quick installation in the pipe string to prevent flow.
shall: For the purpose of this document, *shall* indicates that the recommended practice(s) has universal application to that specific activity.
should: For the purpose of this document, *should* denotes a recommended practice(s) (a) where a safe comparable alternative practice(s) is available; (b) that may be impractical under certain circumstances; or (c) that may be unnecessary for personnel safety under certain circumstances.
simultaneous operations: Two or more of the following activities: production, drilling, completion, work-over, wireline (except routine operations), and major construction operations.
single: One joint of drill pipe, rod, or other tubular goods.
snubbing: Pulling or running pipe under pressure through a sealing element where special equipment is used to apply external force to push the pipe into the well, or to control the pipe movement out of the well.
special services: Those operations utilizing specialized equipment and personnel to perform work processes to support well drilling and servicing operations.
stabbing board: A platform in the derrick on which personnel work while casing is

being run to aid in guiding a tubular joint into another tubular joint for makeup.
stabbing a valve: Aligning and screwing a valve onto the end of a pipe.
stand of pipe: One, two, or three joints of pipe screwed together, and sometimes referred to as a single, double, or triple, respectively.
strand: Several round or shaped wires helically laid about an axis.
stuck pipe: A condition in which the pipe sticks or hangs while in the hole and cannot be moved.
substructure: Structure on which the derrick sits. The substructure may provide space for wellhead and well control equipment.
supervisor: Person who has been given the control, direction, or supervision of work performed by one or more personnel.
surface casing: See *casing*.
swabbing: Lifting of well fluids to the surface using a piston-like device installed on a wireline. Swabbing may inadvertently occur due to piston action as pipe or assemblies are pulled from the well.
swivel: Device at top of the drill stem that permits simultaneous circulation and rotation.
tour: Designates the work period of a rig crew and is usually pronounced as if it were spelled "t-o-w-e-r."
tubing: See *casing*.
tugger line: Tugger line is a wire rope powered by a winch and used for the controlled moving of light loads around a rig.
valve drilling operation: Drilling of a hole through the blocking element of a valve that is stuck in the closed position with pressure on the well side of the valve. The drilling is accomplished through a lubricator assembly that confines the pressure after the blocking element is penetrated.
V-door: The opening in the derrick leading from the derrick floor to the catwalk and pipe rack area.
V-door ramp: A slide-like ramp used to pick up and lay down tools to and from the catwalk/pipe rack area. Also used to pick up drill pipe, drill collars or any other heavy equipment that could not be done safely because of the height of the substructure and close proximity to the blowout pre-venters, electric and hydraulic lines, and other equipment in the area.
well servicing rig: Equipment and machinery assembled primarily for the purpose of any well work involving pulling or running tubulars or sucker rods, to include but not be limited to redrilling, completing, recompleting, work-over, and abandoning operations.
wire line: A special wire, strand, or wire rope of high strength steel used to convey a tool(s) into a hole (also called "well measuring wire" and "well measuring strand"). An electromechanical cable that is an electrical cable armored with high strength steel wires is also called a wire line.
wire rope: Several wire strands helically laid about an axis.

GUIDELINE 01
PRE-DRILLING WORKS BEFORE RIG MOBILIZATION

[GENERAL CIVIL]

Following measures shall be carried out and ensured by Area and Location Management during the civil-works-phase but before rig-mobilization:

- Installation of anti-snake sheet & placing of soil with anti-snake sheet to close the holes below the sheet around rig & camp area.
- Ample rig site area for installation of the emergency escape line to attain about 35 degree slope of line from derrick to ground.
- The volume of mud waste pit(s) must be:
  i. sufficient w.r.t. the target depth of the well;
  ii. pit(s) must also be lined with standardized quality geomembrane; and
  iii. pit(s) must also be barricaded.
- Water storage reservoirs at rig & camp-site, mud waste pit, and waste water pit near washer-man (in living camp) should be barricaded with barbed wire/ fencing and restricted to avoid falling of any person.
- Digging of five solid waste pits / garbage pits for dumping of kitchen, municipal waste and other solid wastes (Three pits in living camp area & two at rig site with dimensions 8ft x 6ft & 6ft deep).
- Proper arrangements for earthing of all rig equipment, generators, diesel storage tanks and living camp caravans.
- Provision of water line (direct water line from main water storage tanks) for fire pump to meet any fire emergency before and during drilling operations.
- Preparation of retaining wall/ secondary containment/ dyke wall (equivalent to the storage volume of HSD) around the HSD/ diesel storage tanks with concrete floor/ bed to avoid spillage during major leakages/ emergency situation.

- Preparation of concrete platform (8ft x 3ft) in front of rig foundation (below dog-house) for placing of fire extinguishers & safety sign boards.
- Removal of construction materials & leveling of camp/ rig area for smooth movement of men and machinery/ vehicles.
- Proper drainage system of waste water from kitchens and bathrooms.
- Preparation of proper covered septic tanks for waste water from toilets/ baths to avoid mosquito's breeding/ odor/ nuisance.
- Installation of screen doors/ windows in kitchens to keep houseflies out of the kitchens, especially door should be installed in the tandoor area of kitchens to keep loaf dogs and cats away to maintain hygiene.
- Installation of a pressurized fire hydrant system having three outlets (one for each camp) at the camp areas of the rig site to timely fight fires. This system may be simple to an extent that its portability is achievable with convenience. The system shall have one or more valves to regulate the water flow depending upon the actual firefighting requirements of the camp site.

[TRENCHING AND EXCAVATIONS]

- Due to terrain difficulties, when operations require excavating and preparing trenches, persons should be knowledgeable regarding the hazards and precautions necessary for preparing and working in trenches.

Underground Hazards

- When preparing an excavation, consider the hazards of underground installations. These include electrical equipment, oil and gas transmission, sewers, water lines, telephone lines and other utilities.

Toxic Gas and Low Oxygen Hazards

- Any trench 4 ft or greater in depth is usually considered a confined space. Entry into these spaces is controlled by special safety procedures where oxygen deficient or toxic gas hazards can reasonably be expected, such as near landfills or near where hazardous materials are used or stored. There is concern that heavy gases can collect inside a trench.

Vehicle Traffic and Falling Loads

- Vehicles on nearby roadways and construction equipment can present hazards at an excavated site. Ensure that barricades and warnings are in place.
- Construction equipment shall not lift material over people in the trench or excavation.
- The soil from the trench is also a hazard to personnel inside the trench, for this reason it must be piled at least 2 ft from the edge of the trench.

Stability of Nearby Structures

- Before beginning an excavation it is important that consideration be given to nearby buildings, light poles or other structures in the area. Additional support, installed by professionals, may be needed.

Escape Means from Trenches

- A stairway, ladder or ramp should be located in any trench that is at least 4 ft (1.2m) deep. The escape means should be placed so that a person is never more that 25 ft away from an escape means.
- A qualified person should inspect the trench at least daily and more frequently if needed, such as after a rainstorm or other hazardous occurrence.
- Any trench 5 ft or deeper, that is not in entirely stable rock, must be sloped or shored in accordance with recognized engineering practices.

[LIVING CARAVANS]

- Sufficient fire/ smoke detectors must be installed in each caravan to transmit an early warning in the eve of an emerging event and be looped with a central panel or siren warning system. A unique alarm pattern shall be designated for the emergencies at camp site to differentiate from the emergencies of drilling operations.
- Two small size (e.g. 2 kg) portable fire extinguishers of fire type A and C shall be placed inside each room/ compartment of the caravan. Whereas, one 10/ 12 kg fire extinguisher to be bracketed outside the wall of each room/ compartment alongside the door.
- A power cut-off switch shall be installed at the door inside of each room/ compartment so that all electrical appliances can be shut down at once while exiting the room to ensure foolproof safety.
- An Electricity Validity Program shall be established to undertake necessary electrical inspections especially during the rig mobilization/ demobilization phases and at the time of purchase/ selection of electrical appliances. Standardization in the electrical wiring scheme must be achieved for the caravans to avoid any electric current leakage and other associated mishaps. For any electrical related repair/ maintenance jobs, Ground Fault Circuit Interrupter (GFCI) must be preferred for connecting the devices/ equipment for safely performing the job(s).

GUIDELINE 02
PERSONAL PROTECTIVE EQUIPMENT

[GENERAL]

- The operator should assess work sites to evaluate the types of hazards present at the specific location.
- When it is impractical to reduce a hazard to acceptable levels by administrative or engineering controls, personal protective equipment (PPE) appropriate for the hazard shall be selected for use.
- PPE for hearing, eyes, face, head, extremities, protective clothing, respiratory protection and fall protection shall be considered for use to protect personnel.

[WEARING APPAREL]

- When identified as part of the employer's PPE assessment, a safety hard hat shall be worn by each person in the work area. The safety hard hat shall meet the requirements of *ANSI Z89.1 Safety Requirements for Industrial Head Protection*; or *ANSI Z89.2 Safety Requirements for Industrial Protective Helmets for Electrical Workers, Class B*.
- Eye protection equipment appropriate for the work being done shall be worn by personnel where there is a reasonable probability of injury to the eyes from flying objects, chemicals, or injurious light or heat that can be prevented by such equipment. This protective equipment shall meet the requirements of *ANSI Z87.1 Practice for Occupational and Educational Eye and Face Protection*.
- When identified as part of the employer's PPE assessment, safety shoes, safety boots, or toe guards shall be worn. Safety-toe footwear shall meet the requirements of *ANSI Z41.1 Men's Safety-Toe Footwear*.
- The employer's PPE assessment should include possible chemical exposures that may necessitate the use of gloves, aprons, boots, or other protective equipment, as appropriate. The assessment should

also evaluate the need for gloves or other protective clothing to provide protection from temperature extremes or sharp objects.

- Appropriate clothing should be worn at all times.
- Loose or poorly fitted clothing should not be worn.
- Personnel should not work in clothing that is saturated with any flammable, hazardous, or irritating substance(s).
- Such clothing should be immediately removed and replaced with suitable clothing after the affected skin area has been thoroughly washed and, if necessary, treated.
- Personnel should not wear jewelry or other adornments subject to snagging or hanging and causing injury while in the work area.
- Personnel with hair of such length as to be a hazard in work areas should keep it contained in a suitable manner while performing their duties. Hair and beard styles shall not interfere with the effective functioning of head, eye, face, or respiratory protective equipment, if such equipment is required at the work site.
- Personnel working over or near water where a danger of drowning exists shall be provided with approved personal flotation devices in serviceable condition.

[HEARING PROTECTION]

- Protection against the effects of noise exposure shall be provided when the sound levels exceed the permissible limits.
- When personnel are subjected to sound levels exceeding the permissible limits, feasible administrative or engineering controls should be utilized. If such controls fail to reduce sound levels within the levels, PPE shall be provided and used to reduce sound levels within the levels of the table.
- The operator should consider implementing the elements of a hearing conservation program as

appropriate to protect the hearing of personnel.

[RESPIRATORY PROTECTION]

- An assessment of the work area shall be done to identify the potential hazards that may require respiratory protection. Employees shall wear respiratory protection appropriate for potential workplace atmospheric hazards.
- For respiratory protection practices, including equipment selection, use, medical surveillance, fit testing, storage, inspection, maintenance, and training, Ref. *ANSI Z88.2-1992, Respiratory Protection*.
- Tight-fitting air purifying respirators shall be used only in areas where sufficient oxygen exists.
- Approved self-contained or supplied-air breathing equipment shall be used for those atmospheres where tests indicate toxic or hazardous gases are present in quantities immediately dangerous to life or health (IDLH) or oxygen content is less than necessary to sustain life.
- Air from the utility system shall not be used as the source for breathing air supply.
- Cartridge type respirators shall not be used for protection from hydrogen sulfide or sulfur dioxide.
- Personnel who may be expected to use breathing equipment shall be trained in the use and operation of breathing equipment available at the work site.
- Personnel shall be advised of the potential dangers of flammable, hazardous, and insufficient oxygen atmosphere.

[FALL PROTECTION]

- All personnel, when engaged in work 6 ft or higher above the ground or adjacent working surfaces, shall be protected at all times from falling by guardrail systems, safety net systems, or personal fall arrest systems (PFAS).
- When the operator can demonstrate that it is unfeasible or creates a greater hazard to use these systems, an alternative fall protection plan can be

developed and implemented that provides for personnel safety.

- When PFAS are used, the following shall apply:
  a. Personnel shall use a full body harness manufactured in accordance with *ANSI Z359.1*.
  b. PFAS shall be inspected prior to each use.
  c. The full body harness shall be attached by means of a lanyard with double-locking snap-hooks to an anchor or structural member capable of supporting a minimum dead weight of 5,400 pounds.
  d. A separate lanyard shall be used by each person requiring a lanyard. The lanyard shall be adjusted to permit a maximum drop of 5 ft in case of a fall.
  e. Manufacturer's instructions for inspection and replacement of PFAS should be followed.

GUIDELINE 03
DESIGN

[EMERGENCY EYE OR BODY WASH STATIONS]

Where the eyes or body of personnel may be exposed to injurious materials/ chemicals, eyewash and shower equipment for emergency use shall be provided.

[CRITICAL EQUIPMENT]

- Critical equipment is defined as equipment and other systems determined to be essential in preventing the occurrence of, or mitigating the consequences of an uncontrolled event.
- Such equipment may include pressure vessels, pressure relief devices, compressors, alarms, interlocks, and emergency shutdown systems.
- Critical equipment should be periodically inspected and tested as recommended by the manufacturer or in accordance with recognized engineering practices.
- When using nondestructive testing (NDT) methods, qualified persons should conduct the tests in accordance with recognized methodology and acceptance criteria. Certified NDT inspectors shall be trained per *ASNT RP No. ASNT-TC-1A*.
- Other types of inspection should be conducted by qualified persons.
- When critical equipment is removed from service, a program should be in place to ensure equivalent protection is provided.

[CHANGES TO CRITICAL EQUIPMENT]

- Procedures to manage changes (except for "replacements-in-kind") to critical equipment should be implemented, as appropriate. These procedures should address the following prior to making the change:
  a. The basis for the proposed change.
  b. Impact of change on safety and health.
  c. Modifications to operating procedures.

d. Authorization requirements for the proposed change.

- Employees whose job tasks will be affected by the change in the critical equipment should be informed of the change prior to start-up.

[FIRE PREVENTION]

- Safe storage and location of combustible and flammable materials and the prevention of accumulation of rubbish are important to fire prevention.
- Smoking shall be prohibited at or in the vicinity of operations that constitute a fire hazard. Such locations should be conspicuously posted with a sign, "NO SMOKING OR OPEN FLAME," or equivalent.
- Smoking shall be permitted by Location Management only in areas designated for smoking. Smoking should always be discouraged as a company policy.
- No source of ignition should be permitted in an area where smoking has been prohibited, unless it is first determined safe to do so by the supervisor in charge or his designated representative.
- Potential sources of ignition should be permitted only in designated areas located at a safe distance from the wellhead or flammable liquid storage areas.
- Equipment, cellars, ground areas around and adjacent to the facility should be kept free from oil and gas accumulations that might create or aggravate fire hazards.
- Combustible materials such as oily rags and waste should be stored in covered metal containers and the covers kept in place.
- Natural gas or liquefied petroleum gas shall not be used to operate spray guns or pneumatic tools.
- Material used for cleaning should have a flash point of not less than 100^0 F.

[FIRE PROTECTION]

- Firefighting equipment shall not be tampered with and shall not be removed for other than fire protection, firefighting purposes, and services.
- A firefighting water system may ONLY be allowed by Location Management to be used for wash down and other utility purposes so long as its firefighting capability is not compromised at all.
- Fire extinguishers and other firefighting equipment should be suitably located, readily accessible, and plainly labeled as to their type and method of operation.
- Fire suppression equipment (extinguishers, fixed systems, etc.) should be periodically inspected and maintained in operating condition at all times. A record of the most recent equipment inspection should be maintained.
- Portable fire extinguishers shall be tagged with a weather resistant durable tag showing the date of the last inspection, maintenance, or recharge or accomplished using other acceptable recordkeeping media. Inspection and maintenance procedures should comply with *NFPA 10*.
- Personnel should be familiar with the location of fire control and selected personnel trained in the use of such equipment. Firefighting equipment shall be accessible and free of obstructions. Fire drills shall be conducted on weekly basis.

[GROUNDING AND BONDING]

- Drilling and well services facilities are subject to various forms of electrical hazards that must be protected against. Static electricity can be generated by fluid movement in vessels, piping and tankage. This results in static sparks being generated which can be an ignition source. Lightning strikes to a facility are also an ignition source. Electrical equipment failure can occur exposing personnel to shock hazards.

[FLAMMABLE LIQUIDS]

Containers

- Hand portable containers for storing flammable liquids should be Underwriters Laboratories (UL) listed or Factory Mutual (FM) approved, or equivalent.
- Tanks, drums, and other containers containing flammable liquids should be properly labeled to denote their contents and should be properly stored when not in use.
- Metal or other conductive material containers should be used in handling, storing, or transporting flammable liquids. The handling of flammable liquids in plastic containers is potentially dangerous due to static charge buildup.
- Metal parts on any plastic containers used in such service shall be bonded to the fill connection. If plastic containers are used, the conductive fill connection or a grounded rod should be inserted prior to filling the container with any flammable liquid.

Fuel and Oil Transfers and Refueling

- Hydrocarbon-fueled engines should be shut down during refueling operations.
- Fuel tanks and bowzers must be earthed during fuel transfer.
- Ensure nearby availability of fire extinguishing equipment during fuel transfer.
- Fuel tanks should be monitored while they are being filled to prevent overfill and spillage.
- During refueling operations, the filling nozzle should be kept in contact with the intake pipe to ensure bonding and prevent fuel spillage.

Liquefied Petroleum Gas (LPG) and Compressed Gas

- Handling, connecting, and transfer operations involving liquefied petroleum gas (LPG) shall conform to *NFPA 58 Standard for the Storage and Handling of Liquefied Petroleum Gases*, and *NFPA*

55 Compressed and Liquefied Gases in Portable Cylinders.

- *Ignition Source Control:* Ignition source controls shall be established in any area where flammable or oxidizing compressed gases are stored or used.
- *Protective Caps:* Where compressed gas cylinders are designed to accept valve protective caps, the user should keep such caps on compressed gas cylinders at all times except when being filled or connected for use.
- Where gas-tight valve outlet caps or plugs are provided, the user should keep such devices on the valve outlet at all times except when compressed gas cylinders are being filled or connected for use.
- Compressed or liquefied gas cylinders in use or in storage shall be secured to prevent them from falling or being knocked over.
- Compressed gas cylinders should be transported, stored and used in an upright position.
- Compressed gas cylinders exposed to fire shall not be used until they are requalified in accordance with the pressure vessel code under which they were manufactured.
- Containers that show denting, bulging, gouging, or excessive corrosion should be removed from service.
- Repair or alteration of containers shall comply with the regulations, rules, or code under which the container was fabricated.
- Compressed gas cylinders shall not be placed where they could become a part of an electrical circuit.
- Compressed gas cylinders should not be exposed to temperatures exceeding 125^0 F. Cylinders shall not be subjected to direct heating to increase vapor pressure.
- Stoves and heaters used with LPG fuel should only be used in well-ventilated areas. Personnel should ensure proper ventilation exists before lighting the

heater/ stove. All hoses and connections on LPG stove or heater systems should be checked frequently to ensure they do not leak.

- Only qualified personnel should be allowed to fill LPG bottles. Protective gloves should be worn when refilling or replacing LPG bottles. There is a possibility of freeze burns if propane comes in contact with skin.

Storage

- Flammable liquids storage areas within any premises or shed should:
  a. Be adequately vented.
  b. Have unobstructed exit(s) leading from the building.
  c. Be maintained with due regard to fire potential with respect to housekeeping and materials storage.
  d. Be identified as a hazard and have appropriate warning signs posted.
  e. Have a Class BC fire extinguisher (*Ref. NFPA 10*) readily available.
  f. Be properly classified for electrical installations in accordance with *API RP 500 or API RP 505*.
  g. Paint and solvents should be stored in an adequately vented area safely away from heat and ignition sources.
- Flammable liquids should not be stored within 50 ft (15.2 m) of the wellbore, except for fuel in the tanks of operating equipment. Where terrain and location configuration do not permit maintaining this distance, equivalent safety measures should be taken.

[EQUIPMENT]

Generators, Motors, and Lighting

- All electrical conductors and switch gear shall be sized in accordance with *NFPA 70*.

- All generators should have an overload safety device that will provide protection from shorting and burnout.
- When adequate fixed illumination cannot be made available, temporary portable lights approved for the electrical classification should be provided. Where possible, floodlights in use should be placed in positions so as not to impair vision of persons in the work area.
- Operations should not be performed using vehicle headlights as a substitute for lighting.
- All electrical extension cords shall be properly insulated and plugs and receptacles shall be in good condition.
- Light fixtures should be placed and maintained to provide illumination for work areas in conformance with *NECA/IESNA-502-99 Installing Industrial Lighting Systems ANSI Approved*.
- Repairs to electrical equipment shall not be performed unless the power source has been isolated and the control has been locked out/tagged out, and the person making the repairs is authorized to do so.
- Electric motors, generators, and control panels shall be grounded.

Electrical Systems

- Electrical equipment used in hazardous locations should be designed for such locations, and listed or approved by a nationally recognized testing laboratory. All wiring components and electrical equipment should be maintained in accordance with the manufacturer's recommendation.
- Wiring should be replaced or properly repaired and sealed as necessary when insulation damage is detected. Because of fire and other hazards, makeshift wiring components and installations should not be used.

Classification of Areas

- Classification of areas shall be in accordance with *API RP 500 and RP 505*.

Tanks, Separators and Heater Treaters

- Tanks, separators and heater treaters should be installed and maintained in accordance with accepted engineering practices or OEM's recommendations.
- Walking directly on the roof of a tank is discouraged. However, if personnel are required to access the roof of a tank, roof integrity shall be checked and appropriate walking surfaces, guardrails or fall protection shall be provided.

Vapor Recovery Systems
(Systems Designed to Minimize Vapor Releases to the Environment)

- Vapor recovery systems should be considered potential sources of ignition; facility design shall consider system location with respect to potential sources of hydrocarbon vapors.
- Devices should be installed to prevent a flame from propagating from the vapor recovery unit into the production equipment.

GUIDELINE 04
OPERATIONS

[GENERAL]

- Well control shall be maintained at all times. Consideration shall be made to ensure appropriate equipment and materials are on location and operational before work commences.
- The rig drill floor shall be attended by a person qualified in well control procedures at all times during operations.
- Personnel should be trained in basic well control, as needed, in relation to their job duties.
- Horseplay and careless acts shall not be permitted.
- Personnel should receive instruction in correct work methods to reduce chance of injury to themselves or fellow personnel.
- An onsite safety program should be established and maintained. Such safety programs should include, but not he limited to, the following:
  a. Instruction of the OM's responsibility for the safety of the crew and equipment during normal operations and possible emergencies.
  b. Indoctrination of new personnel. New rig personnel, regardless of prior experience, should have the job outlined, explained, and demonstrated by OM.
  c. Observation of new personnel work performance should be maintained until the applicable supervisor is satisfied that the personnel can fill the position in a safe and effective manner.
  d. Instruction of crew members on work procedures and safe practices.
  e. Regularly scheduled and impromptu meetings of the crew, in which the probable hazards, problems of the job, and related safe practices are emphasized and discussed.
  f. Good housekeeping practices.

g. Availability of and instruction in the use and maintenance of PPE.
h. General safety education through safety meetings, company publications, and other educational media.

- Unsafe and potentially dangerous conditions should be eliminated or reported immediately to the supervisor In-Charge for corrective action.
- The offgoing tour supervisor shall inform the incoming supervisor of any known special hazards or work in progress that may affect the safety of the crew. Incoming tour personnel shall be alerted to work in progress that could affect their safety.
- To prevent incidents of finger wounds from sharp pipe threads or wickers, pipe threads should be cleaned with a brush.
- Hazardous substances shall be stored in proper containers that are properly labeled. Hazardous waste materials shall be appropriately stored, labeled, and disposed.
- Hazardous waste materials should not be mixed with nonhazardous wastes because the entire mixture is then considered hazardous and subject to hazardous waste disposal requirements.
- Personnel required to handle or use hazardous substances shall be instructed regarding their safe handling and use, and be made aware of the potential hazards and personnel protection measures required. For additional information, consult with the employer and/or hazardous substance manufacturer and research the material safety data sheets (MSDSs). These MSDSs shall be available to the personnel at the workplace prior to and during chemical usage.
- Field welding shall not be permitted on tongs, elevators, bails, or heat treated rig equipment.
- On land locations, vehicles not involved in the immediate rig operations should be located a

minimum distance of 100 feet (30.5 m) from the wellbore or a distance equal to the height of the derrick or mast (including attachments), whichever is greater. Appropriate safety measures should be taken where terrain, location, or other conditions do not permit this spacing.

- The rig substructure, derrick, mast, and other equipment as appropriate, shall be grounded to prevent accumulation of a static charge.

[PRELIMINARY RIG-UP OPERATIONS]

- Prior to commencing rig-up operations, the planned arrangement of all equipment to be placed on the location should be reviewed to eliminate potentially hazardous conditions. For example, the location of rig equipment in relation to pipelines and overhead and underground utility lines should be carefully checked prior to placing equipment on the drilling site.
- Well operations involving the rig shall not be commenced until the rig is rigged up in a safe manner.
- Change rooms and outbuildings should not be located immediately in the near vicinity of rig fuel tanks.
- Prior to initiating well servicing operations, the well shall be checked for pressure. If pressure is indicated, the operator's authorized person should be notified; then proper steps should be taken to remove pressure or to operate safely under pressure before commencing operations.
- Personnel shall be out of the derrick, or mast, and cellar, and stand clear when a subsurface pump is being unseated or when initial pull on the tubing is made.

[BLOWOUT PREVENTION EQUIPMENT
FOR DRILLING AND WELL SERVICING OPERATIONS]

- When drilling or well servicing operations are in progress on a well where there is any indication the

well will flow, either through prior records, present well conditions, or the planned well work, blowout prevention equipment shall be installed and tested.

- When drilling or well servicing operations are in progress on a well where there is any indication the well will flow, the rig shall have on the rig floor a safety valve (stabbing valve) with connections suitable for use with each size and type tool joint or tubing connection being used on the job.
- Blowout prevention equipment should be installed, operated, and maintained.
- Designated rig personnel shall have adequate understanding of and be able to operate the blowout preventer system. New personnel should be trained in the operation of the blowout preventer system as soon as practicable.
- The use of BOP controls, including remote control stations, shall be discussed in the pre-job meeting.
- BOP drills should be conducted under a variety of conditions.
- While in service, blowout prevention equipment should be inspected daily and a preventer actuation test should be performed on each round trip, but not more than once per 24-hour period. Notation of actuation tests performed should be made on the daily report. Annular blowout preventers should be tested in accordance with the manufacturer's recommendations.
- When heavy weighted drilling fluids are in use, choke and kill lines should be flushed as needed to prevent plugging.
- During cold weather conditions, choke and kill lines should be flushed to prevent freezing.
- All pipe fittings, valves, and unions placed on or connected with blowout prevention equipment, well casing, casing head, drill pipe, or tubing and exposed to well pressure shall have a working pressure rating equal to or greater than the

maximum anticipated well surface pressure. The BOP stack and related riser connections should not be short bolted (not less than three threads showing) and should be checked for properly torqued bolts.

- All blowout preventer control lines and valves should be clearly identified.
- When ram-type blowout preventers are being used, at least one ram preventer should be of proper size to fit the tubulars in use.
- Pressure testing of the blowout prevention equipment system shall be conducted prior to drilling out any string of casing except conductor pipe or drive pipe.
- Drilling operations shall not proceed until blowout prevention equipment is tested and determined to be serviceable.
- Personnel should stay clear of BOPs when BOPs are under well or testing pressures.
- Personnel should stay clear of the rotary table when the BOP is operated.
- If the blind ram preventer is closed for any purpose, the valves on the choke lines or relief lines located below the blind rams should be opened to bleed off any pressure prior to opening the rams.
- Blowout prevention equipment that utilizes remote control systems should be installed so that failure of one set of controls does not affect the operation of the backup system.
- BOP stack, choke line(s) and kill line(s) should be anchored, tied, or otherwise secured to prevent whipping resulting from pressure surges.
- BOP equipment shall never be heated or welded on by rig personnel.
- Unnecessary engines and motors that are not critical to the operation should be shutdown during well kill operations.

[HOUSEKEEPING]

- Work areas should be maintained clean and free of debris and tripping hazards.
- Means should be provided to convey any fluids away from the rig floor while pulling wet strings of pipe.
- Leaks or spills should be promptly cleaned up to eliminate personnel slipping and fire hazards.
- If personnel are required to work in a cellar, it should be kept reasonably clear of water, oil, or drilling fluid accumulation.
- No loose equipment or materials should be in the cellar except those in use or about to be used.
- When placing equipment and tools around the rig floor and location, care should be taken to leave egress routes open.
- Tools and equipment should be securely placed and stored in a position or manner so they will not fall.
- Firefighting equipment shall be accessible and free of obstructions.

[CONFINED SPACE OR HAZARDOUS ENVIRONMENTS]

- Where any unusually hazardous gas is known or suspected to exist, the operator shall ensure that personnel, contractor, and service company supervisors are advised of the potential hazards.
- When it is not necessary to maintain a cellar, the cellar should be filled to eliminate a possible confined space hazard.
- A confined space is one that:
  a. Has limited openings for entry and/or exit.
  b. Could contain known or potential hazards.
  c. Is not intended for continuous occupation.
  d. Has insufficient natural ventilation.
- Any confined space that is going to be entered shall be isolated and entry prohibited until the following conditions are met:

a. Completion of internal atmospheric testing, prior to entry to determine:
   i. Oxygen content.
   ii. Acceptable level of flammable gases/vapors.
   iii. Potential toxic air contaminants.

   Note: Entry to conduct tests shall comply with atmospheric testing procedures for confined space testing requirements.
b. Activation of a Confined Space Entry Permit System where hazardous atmospheres exist or have the potential to exist. The system should include the following:
   i. Posting procedures.
   ii. Evaluation of permit space conditions.
   iii. Procedures for safe entry.
   iv. Equipment required (i.e., respiratory protection).
   v. Assignment of attendants and entry supervisors.
   vi. Emergency procedures.
   vii. Permit system.
   viii. Multi-employer coordination.
   ix. Permit cancellation procedures.
   x. Review practices.
c. Declassification of confined space based on removal of all hazards or control of hazards through adequate ventilation.

[MACHINERY AND TOOLS]

- Personnel shall only operate machinery that they are qualified to operate.
- All belts, drive chains, gears, and drives (excluding rotary table, catheads, and kelly) shall have guards installed to prevent all personnel from coming in contact with moving parts.
- Machinery shall not be operated unless all guards are in position and are in properly maintained condition. During maintenance or repair work

limited testing may be performed by qualified personnel without guards in place.

- Maintenance personnel should report to the rig supervisor prior to beginning repairs. They should report hazards that may be introduced. They should report when repairs are completed.
- No personnel shall clean, lubricate, or repair any machinery where there is a hazard of contact with moving parts until such machinery has been stopped or such parts have been properly guarded.
- Hand power tools and similar equipment, whether furnished by the employer or personnel, should be maintained in a safe condition.
- Electrical hand tools shall be double insulated or grounded. Ground Fault Circuit Interruption (GFCI) protection should be used.
- Electric or pneumatic hand tools shall have a deadman switch or be arranged so that the starting switch cannot be locked in.
- When personnel are climbing rig ladders, any tools or other such materials they are carrying should be secured to the person's body.

[LOCKOUT/TAGOUT]

- A lockout/tagout program should be established as follows:
  a. Locks and/or tags should be placed to plainly identify the equipment or circuits being worked on. Critical systems locked or tagged should include the identity or job title of person installing the lock or tag.
  b. Personnel should be trained and disciplined in the use of this system to prevent unexpected operation of any equipment that stores any type of energy that might inflict injury to personnel.
  c. The lock or tag should be removed by the person who installed it or by that person's authorized replacement. In the event neither

individual is available, the lock or tag may be removed by the rig supervisor after ensuring that no hazard will be created by energizing the locked or tagged equipment or circuit(s).

[AUXILIARY ESCAPE]

- On all land rigs, the derrick or mast shall have an auxiliary means of escape installed prior to personnel working in the derrick. The auxiliary escape route should use a specially rigged and securely anchored escape line attached to the derrick or mast so as to provide a ready and convenient means of escape from the derrickman's working platform. The escape line route should be kept clear of obstructions.
- The escape line on masts or derricks should be a 0.787-in. (20-mm) minimum diameter wire rope in good condition. A safety buggy equipped with an adequate braking or controlled descent device should be installed on the wire rope, kept at the derrickman's working platform, and secured in a manner that will release when weight is applied. Tension on the escape line should be periodically checked and adjusted to enhance safe landing of the user. Tension should be set with six to twelve feet of sag in the middle, depending upon the length of cable run. It is recommended that the ground anchor point of the escape line should be located a minimum lateral distance from the derrick or mast equal to two times the height of the work platform. The ground anchor point should be able to withstand a pull of at least 3,000 lb. If the rig configuration or location configuration will not permit use of the escape system, an alternate means of fast emergency exit from the derrickman's working platform to a safe place should be provided.
- Personnel shall not ride the safety buggy or escape equipment except in an emergency. Personnel shall

be trained in the proper procedure(s) for escaping the derrick or mast.

[RACKING TUBULARS AND DRILL COLLARS]

- Any rods, tubulars, drill pipe, and drill collars racked or hung in the derrick or mast should be secured to prevent them from falling across the derrick or mast.
- Safety clamps used on drill collars, flush-joint pipe, or similar equipment to prevent them from falling into the well when not held by the elevators shall be removed from such equipment before hoisting continues.
- Precautions should be taken to prevent pipe, drill collars, or similar round-shaped equipment pieces from accidentally rolling off the storage rack. Stops, pins, or chocks should be used.

[HANDLING DRILLING FLUID CHEMICALS AND ADDITIVES]

- Asbestos shall not be used as a drilling fluid additive. Certain adverse personnel health effects are associated with asbestos. Other materials should be substituted for asbestos in the drilling fluid system.
- Personnel handling drilling fluid and additives should be instructed in the proper handling and disposal methods and personnel protection procedures. Guidance for proper handling and disposal of these materials is available with the manufacturer's Material Safety Data Sheets (MSDS).

GUIDELINE 05
SAFE WORK PRACTICES

[LOAD LIFTING]

- OEM's rated load capacity shall not be exceeded on cranes or other load lifting devices.
- This equipment should be operated and maintained in accordance with OEM's recommendations.
- Tag lines should be used to guide and steady all loads being lifted.
- For non-purpose-built BOP handling systems devised by field personnel, regardless of whether they are intended to be installed on a temporary or permanent basis, the operator shall determine the design load of the system prior to installation to ensure that it is fit for purpose. This shall be accomplished by identifying all components intended to be used in the primary load path(s), and determining the working load limit of each component. The design load of such a system shall be no greater than the working load limit of the weakest component in the load path. *Ref. API Spec 7K & 7L.*

[WELL PUMPING UNITS]

- Power to the pumping unit should be deenergized and locked or tagged out to eliminate potential hazards during well servicing operations. In confined locations, overhead electric power to the pumping unit control panel should be deenergized. Where necessary, power service should be deenergized while moving the rig in or out and during rig-up and rig-down operations.
- During well servicing operations, the pumping unit shall be secured to prevent unintended movement. Use of the brake only or the brake and brake pawl are not acceptable means of securing the pump unit.
- Chain or wire rope sling of suitable strength should be used to handle the horsehead if removal or

installation operations are necessary. On installation, the horsehead should be bolted or latched in accordance with the manufacturer's specifications.

- Upon completion of well servicing operations and before energizing the power source, precautions shall be taken to ensure that all personnel and equipment are clear of the weight and beam movement.
- Brake systems on all pumping units in service should be maintained in safe working order.
- After well servicing operations are completed all pumping unit guards and enclosure guards (belt and motor sheaves) should be reinstalled prior to startup. Guards need not be in place until all final adjustments (pump, spacing, etc.) are made, so long as the safety of personnel is not compromised.

[HOTWORK, WELDING, AND FLAME CUTTING OPERATIONS]

- A written safe work permit (hot work permit) system covering welding and flame cutting operations should be observed. In general, a safe work permit system should consist of authorization to do the work along with the following:
  a. Pre-Work Stage Communications meetings addressing the following:
     i. Simultaneous operations.
     ii. Air/gas testing.
     iii. Equipment isolation.
     iv. Equipment preparation.
     v. Identification of hazards.
     vi. Emergency procedures.
  b. Work-in-Progress Stage:
     i. Posting of permit.
     ii. Air/gas testing.
     iii. PPE requirements.
     iv. Fire watch.
     v. Special procedures/precautions.
  c. Return to Service Stage:
     i. Authorization and turnover signatures

- The supervisor should hold a pre-job meeting with the crew and other involved persons to review responsibilities for the operation to be performed.
- Welding and flame cutting operations shall not be permitted close to flammable liquids, accumulations of crude oil, escaping gas, or locations where sparks, flames, heat, or hot slag could be sources of ignition.
- Only qualified persons should perform welding or flame cutting operations on equipment used to contain hydrocarbons or hazardous materials.
- Appropriate personal protective equipment shall be utilized for hot work operations.

[WELDING AND FLAME CUTTING OPERATIONS]

- If the object to be cut or welded cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.
- If the object to be welded or cut cannot be moved, and if all the fire hazards cannot be removed, guards shall be used to confine the heat, sparks, and slag and to protect the immovable fire hazards.
- A safe welding area may be designated. In this area, welding and flame cutting operations can be conducted with minimal concern of providing an ignition source for flammable hydrocarbons or combustible materials.
- Properly maintained fire extinguishing equipment shall be available for immediate use. A minimum of at least one 12-kg dry chemical fire extinguisher shall be immediately available during welding or cutting operations. This equipment is in addition to the general fire protection equipment.
- Fire watches with extinguishing equipment shall be required whenever welding or cutting is performed in locations other than designated safe welding areas.

- A fire watch shall be maintained for at least one half hour after completion of welding or cutting operations.
- Before cutting or welding is permitted in areas outside a designated safe welding area, the area shall be inspected by the individual responsible for authorizing cutting or welding operations. This individual shall designate the precautions to be followed in granting authorization to proceed.
- Cutting or welding shall not be permitted in the following situations:
  a. In areas not authorized by the supervisor.
  b. In the presence of an explosive atmosphere.
  c. In areas near storage of large quantities of exposed readily-ignitable materials.
  d. Where ignition can be caused by heat conduction, such as on metal walls or pipes in contact with combustibles on the other side.
  e. On used containers such as drums unless properly cleaned.

[WELDING FUMES AND VENTILATION]

- Toxicity depends on the composition and concentration of the fumes. The composition and quantity of fumes depends on the materials being welded, the composition of the welding rods, any coatings or paints encountered in the welding operations, the process used, and the circumstances of use. Toxic fumes can be generated from welding on metals coated with or containing alloys of lead, zinc, cadmium, beryllium, and certain other metals. Some paints and cleaning compounds may also produce toxic fumes when heated. The potential health effects range in type and severity, depending on these factors; and some effects can be extremely serious.
- Mechanical ventilation at the minimum rate of 2,000 ft3/min (0.944 m3/s) per welder shall be provided when welding:

a. In confined spaces or where the welding space contains partitions, balconies, or other structural barriers to the extent that they significantly obstruct cross ventilation.
b. Where the nature of the welding, cutting, or brazing work is such that the release of toxic fumes or gases is possible. This includes work on stainless steel, zinc, lead, and degreasing or cleaning compounds containing HCs.

- Adherence to confined space entry procedures shall be followed prior to any re-entries. For example, releases from acetylene cutting equipment could change the atmosphere within the confined space.

[WORK IN PROXIMITY TO EXPOSED ENERGIZED POWER SOURCES]

- Neither equipment nor machines on rigs (includes guylines) shall be operated closer to power lines than the recommended minimum clearances, except when such lines have been deenergized and visibly grounded or when barriers are present to prevent physical contact with the lines.
- An individual should be designated to observe equipment clearance. The operator should notify the observer if he is having any difficulty in determining the clearance. The observer should sound a warning at any time the clearance is not maintained.
- When cage-type boom guards, insulating guylines, insulating links, or proximity warning devices on rigs or guylines are used, the recommended minimum clearances are applicable.
- Overhead wires should be considered energized (live) unless either the electrical system owner reports them to be non-energized, or a qualified electrical person tests and finds them to be non-energized.

GUIDELINE 06
WELL EVALUATION, TESTING AND WORKOVER

[GENERAL]

- Designated HSE Representatives of both operator and service company must be available during the well evaluation, testing and workover to enforce the safety measures/ precautions.
- Safety meeting should be held with all concerned prior to the operations. Minutes of safety meeting must be recorded and distributed.
- Testing of well shall be conducted during day light hours only.
- The operator shall ensure that fire pump (with hydrant) or fire lorry in good working condition along with adequate crew is available during the well evaluation, testing & workover operations.
- The operator should maintain the sanctity of hazardous areas. Hazards identification & risk assessment practices to be carried out and should be based on the prevailing conditions. Testing of wells with high volatile liquid and flow rate need to be thoroughly reviewed for proper separation and to avoid spreading of fumes in the vicinity.
- Testing of wells by following proper layout of equipment ensuring appropriate/ safe distances, considering 2nd stage separators and installation of breather valves at the tanks so as to vent the vapors to flare/ burn pit & avoid fumes in the area must be considered before the start of testing.
- During testing, the bowzer filling mechanism through a temporary filling gantry should be discouraged. In case it becomes inevitable, then prior approval from the concerned regulatory body must be acquired.

[ENVIRONMENTAL INSTRUCTIONS]

- The operator shall adhere to well testing and workover programs which should be designed to mitigate potential impact on environmental resources and the community.

- The operator shall identity and protect aquifers, which are an underground source of drinking water, or other aquifers, which may be used by the community for drinking or agricultural use.
- The operator shall not allow any formation fluid (oil, condense or water) to flow uncontrolled. If during an emergency, however, the formation fluid is released, the flow should be directed to a flare pit, emergency pit or flare stack at a site and safe distance.
- The operator shall not release produced water into the environment (through percolation, land application, and discharge to surface water) if such release may adversely affect soils, surface water, groundwater, organisms or wildlife.
- In wetlands or coastal areas, extra precautions shall be taken to ensure that unburned hydrocarbons are not released into the water. If the test site is in the vicinity of a river, unburned hydrocarbons should not be allowed to flow into the river.
- Evaporation ponds permitted for storage or disposal of produced water, with the exception of emergency saltwater pits are required to be lined - except where the Management has conclusively demonstrated through an EIA or IEE that the pit cannot cause pollution of surrounding agricultural land nor pollution of surface or subsurface water.
- Evaporation ponds used for disposal of production water shall be constructed to prevent vertical and horizontal seepage.
- Evaporation ponds shall be properly fenced to avoid any incident or injury.
- The operator shall ensure that possible presence of H2S in produced fluids is properly noted.
- The operator shall take additional measures to ensure that minimal or no hazardous materials are used during the well completion and that procedures are in place to prevent spillage of

completion fluids (often acids) during the completion operation.

- The operator shall implement appropriate zone isolation procedures. Packers, for instance, should be properly set to seal off production horizons from other zones to preclude vertical contamination of other zones including groundwater aquifers.
- The operator shall segregate hazardous wastes from non-hazardous wastes. Hazardous wastes must be stored, managed and disposed in a safe manner which will not cause harm to humans, animals, or environmental resources.

GUIDELINE 07
WELL STARTUP PROCEDURES

[GENERAL]

Introducing a new or worked-over well to a separation process, pipeline or storage facility may create additional hazards to the operation. The properties of the well should be reviewed to determine the extent of the hazards. Depending upon the risks of the hazards the following elements should be considered.

[DESIGN REVIEW]

- A design review should be performed to verify that the facility's equipment can safely process the wellstream.
- The design information should include, as appropriate, a simplified process flow diagram and acceptable upper and lower limits, where applicable, for items such as temperature, pressure, flow and hydrocarbon composition.
- Where process flow diagrams no longer exist, similar information may be developed in conjunction with a hazards analysis in sufficient detail to support the analysis.

[PRESSURE RELIEF]

Pressure relief systems should be properly sized, installed, maintained and operated to minimize overpressure. *Ref. API 520 and 521.*

[STARTUP PROCEDURES]

General

- Oil and gas wells have varying characteristics as follows: –
  - Shallow vs deep
  - Low vs high pressure
  - Sweet vs sour
- Startup procedures should be tailored to the particular well characteristics. Well startups are classified as initial startup, normal or routine startups, and startup after an extended shutdown.

Pre Startup Safety Review

Prior to startup of a new facility, or after modification of an existing facility, certain activities should be conducted to prepare the facility for safe operations. The following areas should be considered:

- Construction has been completed according to design requirements.
- Piping and valves are properly installed.
- All safety and control devices are set and operate properly.
- Applicable safety and control devices are functioning properly.
- Eliminate potential ignition sources.
- Pre-job safety meeting.

Initial Startup

The following procedures should be considered:

- Pressure test from well to choke at maximum wellhead pressure.
- Pressure test from choke to production equipment, including flowlines, at expected line pressure.
- Pressure relief systems are operable.
- Valves are set correctly.
- Purge air from the well and associated equipment using hydrocarbons or other acceptable means.
- Monitor flow and bring well online.
- Pre-job safety meeting.

Normal or Routine Startup

The following procedures should be considered:

- Pressure relief systems are operable.
- Valves are set correctly.
- Monitor flow and bring well online.
- Pre-job safety meeting.

Startup After Extended Shutdown

- After an extended shutdown, an equipment assessment should be conducted prior to well startup. This assessment should include inspections

for corrosion, missing or modified equipment, and overall integrity of the facility.

- After the assessment is competed, and repairs and corrections are made, well startup should follow initial startup procedures or normal startup procedures, as applicable.

GUIDELINE 08
WORKING UNDER HYDROGEN SULFIDE ENVIRONMENT

[GENERAL]

- The operator shall establish an *Operations Work Plan* consistent with the guidelines in this document.
- Prior to starting operations, operating company, contracting company, drilling company, service company, and other job-related representatives should discuss pertinent well data and information pertaining to the operations.
- The operator or his representative should provide and review the *Hydrogen Sulfide Contingency Plan* with the drilling or servicing company representative prior to rig up of equipment.
- The operator should also review the service company's immediate action plan to ensure coordinated response in the event of a hydrogen sulfide emergency.
- Daily checks should be performed by the designated wellsite supervisor prior to beginning work each day. The following items should be checked:
  a. The work site for the presence of hydrogen sulfide.
  b. Wind direction indicators. The results of this check may require redesignating the safe briefing areas.
  c. Hydrogen sulfide monitoring or detection equipment and alarm (function test).
  d. Placement of personal protective breathing equipment.
  e. Placement of fire protection equipment.
  f. Appropriate first aid equipment.
- Where required/ applicable, H2S Scavenger (e.g. Zinc Carbonate) may be mixed with brine water and circulated inside the well to lower the concentration of H2S.

[FLUID STORAGE]

- Hydrogen sulfide gas breaking out of stored fluid can be hazardous to personnel, especially if located in an enclosed space. Extreme caution should be exercised where there is potential that the fluid has been exposed to hydrogen sulfide and is stored in "mud or workover" pits, trip tanks, reserve pits, slug tanks, or other tanks.
- Hydrogen sulfide may be generated by chemical reaction between stored fluids and other materials (residual or added). Personnel should take appropriate safety precautions when entering any enclosed or restricted ventilation area which contains or has contained stored fluid.
- Contaminated fluid should be disposed of in a safe manner or properly treated.

[HYDROGEN SULFIDE FROM PRESSURE MAINTENANCE AND/OR WATERFLOODING OPERATIONS]

- Pressure maintenance and/or waterflooding operations may introduce bacteria that can cause water soluble hydrogen sulfide to develop within the producing formation over time and be present in produced fluids. Operators of such producing properties should be alert to this possibility and should warn drilling or well servicing personnel that hydrogen sulfide may be encountered in the performance of their normal work.

[SPECIAL PRECAUTIONS]

- Special precautions should be taken during well drilling or servicing work, such as blowing the well down, dismantling wellhead equipment and flow lines, circulating the well, pulling pumps and packers, and swabbing after acidizing operations so that hazards due to the release of trapped hydrogen sulfide can be avoided.
- All drilling and/or servicing personnel should be trained in the potential dangers of hydrogen sulfide

and precautions to be taken when it is encountered.

- Continuous hydrogen sulfide monitors/detectors should be available when drilling, working over or servicing a well with a potentially hazardous concentration of hydrogen sulfide.
- Protective breathing equipment shall be located so that it is quickly and easily available.
- Mechanical ventilation equipment like bug blower may be used to direct vapors in the desired direction as protection against calm or light winds.
- Particular emphasis should be placed on low-lying work areas, such as cellars, where hazardous concentrations may develop because of the heavier hydrogen sulfide or sulfur dioxide settling in these areas.

[HYDROGEN SULFIDE AND SULFUR DIOXIDE DRILLS]

In addition to hydrogen sulfide and sulfur dioxide training for personnel, periodic emergency drills shall should be held. These drills should include those steps necessary to implement the emergency procedures. Records of personnel training and emergency drills shall be documented and should be retained for a minimum of 1 year.

[HYDROGEN SULFIDE IGNITION SOURCES]

- When mixed with air, hydrogen sulfide can be explosive. To minimize potential sources of ignition, the following items should be considered:
  a. Enforce "No Smoking" rules.
  b. Locate portable generator units, dog houses, and change rooms as far from the wellbore as practical, or take appropriate safety measures.
  c. Prohibit vehicles equipped with catalytic converters in the immediate vicinity of the wellbore unless measures have been taken to ensure that the area is safe from the potential of ignition. Vehicles not involved in the immediate operations should be a minimum of

100 ft (30.5 m) from the wellbore or a distance equal to the height of the derrick or mast, whichever is greater, but in all cases should be outside the derrick or mast guyline perimeter. Comparable safety measures should be taken when terrain, location, or other conditions do not permit this spacing.

d. Spark arrestors or equivalent equipment should be provided on all internal combustion engine exhausts located within 100 ft of the wellbore.
e. Restrict open flame stoves, open fires, welding operations, or other possible sources of ignition (electrical power tools, two-way radios, etc.) to designated areas.

[CARE DURING SPECIAL OPERATIONS]

- Although some special operations may require or be enhanced by the use of a drilling or servicing rig, most special operations can be accomplished with or without a rig on location.
- Adequate lighting should be provided in the work area(s) when special operations are required to be performed during the hours of darkness.
- Operators of potential hydrogen sulfide producing properties shall alert employees and special operations service contractors of the possibility of hydrogen sulfide and sulfur dioxide atmospheric concentrations greater than action levels may be encountered in the performance of their work.
- Hydrogen sulfide and sulfur dioxide monitoring equipment shall be provided at the work location during special operations. Special operations include, but are not limited to, the following operations:
  a. Venting Operations.
  b. Wireline operations, which include all types of wireline such as multi-strand conductor (electrical) line, multi-strand non-conductor line, and single-strand (slick) line.

c. Perforating operations.
d. Snubbing operations.
e. Continuous reeled (coiled) tubing operations.
f. Freezing (plug).
g. Valve drilling and hot tapping operations.
h. Coring operations.
i. Well evaluation and testing operations.

[VENTING OPERATION]

In addition to the other provisions of these guidelines, when opening or bleeding a tool, lubricator, or any other device which has the potential to release hydrogen sulfide, appropriate piping should be installed to vent to a suitable remote location.

[WIRELINE OPERATIONS]

- *Wireline Lubricator Equipment:* If the well is capable of flowing, the minimum lubricator equipment should consist of:
  a. Wireline valve (blowout preventer).
  b. Lubricator (riser) section(s).
  c. Pressure bleed valve.
  d. Stuffing box or control head. When opening or bleeding a tool, lubricator, or any other device that has the potential to release hydrogen sulfide, appropriate piping should be installed to vent to a remote location. Otherwise, proper personal protective breathing equipment shall be worn by all personnel involved in the operation and with a potential to be exposed to hydrogen sulfide.
- *Wireline Materials Wireline:* materials should be suitable for the environment to which they will be subjected. Where hydrogen sulfide is the single chemical factor involved, several wire materials are available that are highly resistant to SSC.
- Consideration should be given to pretreating wirelines and slicklines with corrosion inhibitor(s) prior to running them in the well. In addition, consideration should be given to onsite inspection

and field ductility testing of the wireline to detect pitting, surface damage, or embrittlement of the material that may have been incurred during operations.

- Some wire materials that are resistant to the effects of a hydrogen sulfide environment may not be adequate if other chemical elements, such as halides, are present. Halides include a class of chemical compounds commonly occurring in oil and gas wells. Examples of halide compounds that may be present in well fluids are hydrochloric acid, salt water, calcium chloride, and zinc bromide. Halides at elevated temperatures, such as are commonly present in the lower regions of the tubing string, can embrittle stainless steel wirelines. Metallurgical consultation may be required prior to running stainless steel wireline into well fluids containing halides.

[WELL SWABBING OPERATIONS]

The swabbing unit should be placed upwind from the wellbore, swabbing tanks, and pits. On a still day, the prevailing wind direction should be considered in positioning the swabbing unit.

[SNUBBING OPERATIONS]

- Snubbing operations should be restricted to daylight hours, excepting where existing emergency or environmental conditions dictate that such operations be performed in hours of darkness.
- Operations in the basket should be performed with the minimum number of essential personnel required.
- When working atop snubbing equipment (in the basket), an escape device shall be provided for each employee at the work level.
- No employee shall be allowed in the snubbing workbasket without proper equipment (e.g., self-contained air supply for escape or emergency use

or an escape device being immediately available for use).

[CONTINUOUS REELED (COILED) TUBING OPERATIONS]

- Cold working of continuous reeled tubing can affect material hardness. A quality control program should be implemented to monitor tubing condition.
- Placement of the Reel Unit The continuous reeled tubing unit should be placed upwind of the well, considering the prevailing wind direction and specific wellsite conditions.
- The reel unit and its conveyance should be adequately secured so as to prevent any unwanted movement.
- Special Equipment When possible, a flanged type connection should be used on the bottom connection of the coiled tubing blowout preventer.
- In pressured operations, consideration should be given to a dedicated pump cross and a second set of tubing ram preventers located below the pump cross.
- Wellbore fluids should not be routed to the coiled tubing operation enclosure for the purpose of instrumentation or other uses.

[VALVE DRILLING AND HOT TAPPING OPERATIONS]

- Equipment used in valve drilling and hot tapping operations shall be suitable for hydrogen sulfide service.
- The rated working pressure of all equipment used in these operations should exceed the anticipated pressure inside equipment being drilled or tapped.
- The bleed-off ports on the lubricator and lubricator assembly should be equipped with two (2) valves in series on each port. These valves should be suitable for hydrogen sulfide service and shall have a rated working pressure that equals or exceeds the rated working pressure of the lubricator assembly. The outer valve should be used as the operational valve

in order to conserve the innermost valve for emergency use.

[CORING OPERATIONS]

- Precautions should be implemented prior to pulling cores from known or suspected hydrogen sulfide bearing zones.
- Crew members should don protective breathing equipment at least 10 stands before the core barrel reaches the surface or sooner if the action levels are reached.
- Portable hydrogen sulfide monitoring equipment should be used to check the core barrel when it is opened and when the core sample is removed.
- Personnel should continue to utilize protective breathing equipment until the atmosphere is determined to be below action levels.
- Appropriate precautions should be employed for the handling and transportation of samples containing hydrogen sulfide. Sample containers should be made of hydrogen sulfide resistant materials and appropriately labeled.

[WELL EVALUATION AND TESTING OPERATIONS]

- The following personnel safety precautions should be considered:
  a. Operations should be performed with the minimum number of essential personnel required. These personnel shall utilize the necessary equipment to safely perform the operation(s) and maintain related equipment and services.
  b. Protective breathing equipment shall be located so that it is quickly and easily available to essential personnel.
  c. Atmospheric conditions should be monitored with appropriate hydrogen sulfide detection equipment.
  d. Prior to initiation of such operations, special safety meetings shall be conducted for all

personnel who will be on the rig facility, with particular emphasis on the use of proper protective breathing equipment, first aid procedures, and emergency response procedures. Only H2S qualified personnel may perform work.

e. All produced gases shall be vented and/or flared in such a manner as to ensure personnel safety. Gases from stored test fluids should also be safely vented.

f. "No Smoking" rules shall be vigorously enforced.

g. Personnel handling fluid samples from known or suspected hydrogen sulfide zones should exercise caution until such operations are completed. Appropriate precautions should be employed for the handling and transportation of samples containing hydrogen sulfide. Sample containers should be made of hydrogen sulfide resistant materials and appropriately labeled.

GUIDELINE 09
HEALTH AND HYGIENE

Following guidelines must be complied with to maintain healthy & hygienic occupational environment among workforce:

[CATERING & HYGIENE]

- Dining tables should be covered with metal sheets.
- Floors, walls, and ceilings should be cleaned at least once a day.
- Food should be thawed in the refrigerators free of vermin.
- Water used for cooking should be of same standard as drinking.
- Food should be cooked in metal cooking pot which be immediately cleaned after every meal.
- The food once cooked should be kept hot at 63^0 Celsius or above.
- Dishes and eating utensils should be washed thoroughly with hot water containing detergents.
- Raw food should be kept separate from the cooked food.
- Food should be transported in a food container and not mixed with other goods.
- Food container should be cleaned immediately after being emptied.
- The food container should be marked 'Food Only'.
- The waste and spillage should be cleared immediately.
- Food should not be stored on the floor, but on suitable shelves.
- Detergents, soaps, insect killers and other chemical products should be stored in a separate location.
- Food handlers should have clean, short or netted hair and clean short finger nails, regular bathing habits and clean cloth wearing of closed shoes is mandatory (no sandal or slippers).
- Food handlers with skin, nose, throat problem or suffering from colds, diarrhoea or vomiting should

report immediately to the medical Rep. and should not be allowed to handle until clearance.

- Hands should be washed with soap after using the toilets or cleaning a spill, or even after smoking etc.

[CATERING CREW HYGIENE]

- Catering crew must be free of contagious diseases, cuts, sores, and colds when handling and preparing food.
- Kitchen staff should get examined often for their hygiene.
- Kitchen staff should wash their hands, properly scrubbing with soap and water, prior to handling of food, after handling uncooked food and using the toilet.
- Kitchen staff should keep their nails and hair short.
- Kitchen staff should report on duty in clean proper clothes (uniform, cook's cap,& hair nets.)
- Kitchen and dining facilities whether in tents or mobile units should have the same requirements for cleanliness and sanitation.

[HYGIENE ON LIVING QUARTER]

- Floors should be kept clean and washed with disinfection at least once a day.
- Spills should be cleaned immediately.
- Bed rooms should be tidied - kept neat and clean.
- Bed sheets and pillow cases should be systematically changed whenever the person occupying the bed is replaced, or at least one a week.
- Towels should be installed in the vicinity of the wash basins and liquid soap should be provided for washing of hands at communal places to avoid multiple contacts and spread of vectors.

GUIDELINE 10
DRILLING WASTE MANAGEMENT AND DISPOSAL

[HAZARDOUS MATERIALS]

- The operator to prepare an annual inventory of all potential and identified hazardous waste materials and to provide the inventory report, if requested, to local emergency response authorities.
- The operator will substitute where practical and feasible non-hazardous chemicals to replace hazardous chemical use.
- Drilling mud additives should be restricted to non-hazardous materials to ensure that the resulting pit waste can be easily disposed with minimal environmental impact.

[PIT DESIGN]

- The operator should design and maintain all pits to minimize adverse impact to the environment.
- No operator or person should use any pit for storage of oil or oil products
- All pits, except for the following exceptions, should be lined with an impermeable lining such as a synthetic plastic PVC liner to ensure that no horizontal or vertical leakage occurs. Exceptions include:
  i. Emergency saltwater storage pits;
  ii. Drilling pits associated with wells less than 5000 feet where only freshwater drilling muds were used and have tested less for low chlorides (> 500 ppm) and have prohibited all hazardous mud additives and oil based drilling muds.
- The operator should use synthetic liners for high chloride (chloride > 5000 ppm) or oil based muds.
- Liquid level of the pits should not be permitted to rise within two feet of the top of the pit dikes.
- Liquid level of the pits should not be permitted to rise within two feet of the top of the pit dikes. Pit dikes or walls should be maintained at all times to prevent

deterioration, subsequent overfill, and leakage of contents.

- If required, observation wells should be installed in sensitive areas to determine potential impact on the upper aquifer.

[NON-HAZARDOUS WASTES]

- The operator should avoid disposing of unused commercial products and should try to return them to the vendor or use them at another location.
- All non-hazardous wastes should be segregated from hazardous wastes.
- The operator should dispose of any mixture of non-hazardous and hazardous wastes as hazardous waste, and must comply with existing hazardous materials storage, use and disposal requirements.

[HAZARDOUS WASTES]

- Hazardous wastes must be stored, managed and disposed in a safe manner which will not cause harm to humans, animals, or environmental resources. The operator should comply with existing hazardous materials storage, use and disposal requirements.

Camp Site Waste

The operator should collect and treat camp site wastewater and sewage to satisfy Federal and local effluent requirements.

Sanitary Waste

The operator may use septic systems, packaged wastewater treatment units, or portable commercial containers for disposal of wastewater and sewage at a drilling or production camp site.

Refuse Disposal

The operator should comply with all local refuse disposal regulations. If no local regulations exist, the operator must comply with best management practices which may include incineration of combustible refuse, segregation of recyclable materials, or burial of biodegradable waste onsite, depending upon local waste regulations.

[OTHER ENVIRONMENTAL GUIDELINES FOR CAMPSITES]

i. Latrines should be located at a suitable distance from a water body.
ii. Sewage should be handled to prevent surface and groundwater contamination.
iii. No litter (i.e., food waste, packaging, etc.) should be left onsite.

GUIDELINE 11
INSTRUCTIONS FOR SITE RESTORATION

The operator must restore disturbed areas to approximately pre-existing conditions, subject to agreement with the landowner, DGPC and concerned EPA that desirable development features may be retained. Pit sites should be restored to their pre-existing condition after the pits serve their purpose.

Specific Guidelines are as follows:

[DRILLING AND PRODUCTION SITES]

- The operator should upon completion of production or drilling activities, and where DGPC, local authorities and landowner agree the facilities have no future use, return the well site to its previous condition.

[PIT CLOSURE]

- Within 12 months after drilling, unlined drilling pits should be closed by trench burial method.
- Within 6 months after drilling, lined pits containing hazardous materials should be closed through encapsulation with a geomembrane cap. Pits not containing hazardous wastes may be closed by mixing and filling.
- Other types of pits (such as flare and workover pits) should be closed within 30 days after use.

GUIDELINE 12
INSTRUCTIONS FOR OPEN AUCTION

While opting for an Open Action of critical items, Press Tender would be advertised as per company policy based on the a) the justification explicitly showing ineffectuality of the items and b) proper value determination of the items by a Committee.

Open auction would be mandatory for the following category of items:

- **Operational:** Weary assemblies and spares of engines, pumps, generators, pipes of different sizes, welding plants, rig mast structures, production tubing and other valued electrical and mechanical assets.
- **Support:** Unserviceable support vehicles including Ambulance, Dozers, Trailers, Bouzers, Fork Lifters, and Cranes.
- **Product related:** Used Chemicals/ Oil and Sludge collected from the separators/ pipelines/ tanks.

Note:- *The above steps may generally be taken by/ through Material Management/ Stores Section.*

GUIDELINE 13
DRIVING SAFETY

1. All categories of vehicle, including self propelled mobile plant, must not be operated unless:
   - Vehicle is fit for purpose, inspected and confirmed to be in a safe working order.
   - Number of passengers does not exceed manufacturer's design specification of the vehicle
   - Loads are secure and do not exceed manufacturer's design specifications or legal limits for the vehicle
   - Seat belts are installed and worn by all occupants
   - Safety helmets are worn by riders and passengers of motorcycles and similar types of vehicle
2. Drivers must not be authorized to operate vehicle unless:
   - They are trained, certified/ licensed and medically fit to operate the class of vehicle
   - They are not under the influence of alcohol or drugs, and are not suffering from fatigue
   - They do not use hand-held cell phones and radios while driving (best practice is to switch off all phones and two-way radios while driving)
3. All vehicles shall be equipped with the following standard emergency equipment:
   - fire extinguisher that is approved for the type vehicle, and
   - approved first aid kit.
4. Only designated personnel shall operate a company vehicle.
5. Hitchhikers may not be given rides in a company vehicle.

ANNEXURE A
MINIMUM APPROACH DISTANCE

The closest distances an employee is permitted to approach an environmentally sensitive area or an energized or a grounded object in terms of safety are mentioned below:

From Environmental Perspective

Activity	Recommended Safe Distance
New access tracks	50m from all surface water sources; 100m from cultural sites (including graveyard and shrines); 100m from villages
Campsite	500m from communities, cultural sites (including graveyard and shrines) and surface water bodies
Soak pits (sanitary pits and biodegradable garbage pits)	300m from all surface/ground water sources
Burn pit	500m from communities
Installation of new tube wells	500m from existing wells
Exploration & production facilities should be installed	300m from protected areas; 200m from culturally sensitive sites
Drawing ground water from the wells or springs	At least 50m from sources of contamination.

From Safety Perspective

Activity	Recommended Safe Distance		
	Rig Status	*Line Voltage*	*Minimum Clearance, ft.*
Recommended Minimum Clearances Between Power Lines and Derricks, Masts, or Guylines	*Operating rigs*	All	10 ft plus 4 in. for each additional 10 kV over 50 kV
	In transit (lowered mast)	less than or equal to 50 kV	4 ft (1.2 m)
		greater than 50 kV	4 ft plus 4 in. for every additional 10 kV

Flammable liquids should not be stored (except for fuel in the tanks of operating equipment)	Within 50 ft (15.2 m) of the wellbore
On land locations, vehicles not involved in the immediate rig operations should be located	A minimum distance of 100 feet (30.5 m) from the wellbore or a distance equal to the height of the derrick or mast (including attachments), whichever is greater.
A stairway, ladder or ramp should be located in any trench that is	At least 4 ft (1.2m) deep.
The escape means in a trench should be placed so that a person is never	More that 25 ft away from an escape means.
Personnel shall be protected at all times from falling by guardrail systems, safety net systems, or personal fall arrest systems (PFAS)	When engaged in work 6 ft or higher above the ground or adjacent working surfaces
Spark arrestors or equivalent equipment should be provided on all internal combustion engine exhausts located	Within 100 ft of the wellbore.
Minimum horizontal working distances to overhead power lines	Minimum 10m at both sides
Personnel to be kept clear of civil works machinery whilst it is in operation	At minimum distance of 5m
Distance between crane boom and Riggers	Barricaded around swing radius. (Keep visual contact with helpers at all time + Install audible signals on cranes)

Oxygen and Fuel cylinders to be stored with each other or be separated by a known combustible barrier	20 feet apart
Work permit required for Excavation	If excavation required below 4 feet depth
Work permit required for Work At Height	6 feet height or above
Safety harness should be worn for work	6 feet height or above (if guard rails not available)
Use of Scaffold	For working at 1.5m height or above
Work permit required for Hot Work Operations	On or near operational process areas or within 50 feet of flammable/ combustible materials, fumes, battery storage or charging areas (Fire hazard must be removed, covered with a fire-resistant/ insulating material or otherwise protected.)
Distance between ladder and wall	1:4 rule or 75 degree angle from wall (structure)
Fire extinguishers/ hydrants must be present	25 to 75 feet from flammable materials/ substances
Distance between two workers in a workplace/ workshop	10 feet
First aid box in a workplace	6 to 8 feet from the nearest worker
Distance between fire water pump and fire water reservoir in a workplace	20 to 30m
Electrical equipment/ fittings installed or operated shall be of flame proof or intrinsically safe construction	Within a radius of 15 meters of Zone 0 (Class 1 Div 1)

Note: *The above list is not exhaustive/ final.*

ANNEXURE B
COLOR CODE FOR COVERALL AND HARD HAT/ SAFETY HELMET

Color of Coverall	Recommended Categories for Use
Grayish Blue	OGDCL Officers
Red	Firefighting Crew
Dark Blue	OGDCL staff members; laborers (other than Officers)
Not specified	Contractors shall comply as per their own company's policy

Note:- *All Coverall Uniforms shall be Fire Retardant.*

Color of Safety Helmet	Recommended Categories for Use (for working in PPE required areas)
White	OGDCL Officers (Location ICs, Sectional ICs, Engineers, etc.)
Yellow	OGDCL staff members; laborers (other than Officers)
Green	HSE Reps. (Engineers/ Officers)
Red	Firefighting Crew
Blue	Employees of Contractors / Sub-contractors working at site
Brown	Welders or workers taking up high heat or high voltage jobs
Grey	All types of Guests/ Visitors

Note:- *In addition to color coding, the selection of the helmets shall be made with the intention a) to reduce the force of impact of falling objects, b) to reduce the force of impact resulting from a blow which may be received off center or to the top of the head and c) to reduce the danger of contact with exposed high-voltage electrical conductors.*

ANNEXURE C

COLOR CODING FOR MAINTENANCE OF LIFTING GEARS

- Lifting equipment comprises lifting appliances (equipment performing the lifting), lifting accessories (devices that connect the load to the lifting appliance 'GEARS') and lifted equipment (e.g. containers, baskets, etc). All shall be marked with the Working Load Limit (WLL) and Safe Working Load (SWL).
- An equipment register, including maintenance records and evidence of certification to be available with Operator.
- Following are some of the items used as gears in lifting activities;

Wire rope slings	Chains and chain slings	Man-made fibre slings	Shackles
Beam- and Plate clamps	Eye bolts & swivel rings	Hoist rings	Turnbuckles
Wedge sockets	Lifting harnesses	Drill pipe elevators	Casing elevators
Bail arms	Spreader beams	Hooks	Load cells
Pad eyes and bolts	Rigging screw	Pallet hook	

- Color coding shall be an add-on for visual inspection and confirm the following aspects;
  a) an inspection has been carried out;
  b) whether or not inspection is current; and
  c) to determine the inspection results by being able to link back from the physical evidence to the records.
  d) Location ICs shall ensure that all portable, circulating & fixed lifting equipment and accessories for lifting, after thorough examination, are color coded to give visual indication of their certification and fitness status:-

Color Code	Period
Green	Lifting accessories, which have been inspected and found fit for purpose should be color-coded for a maximum six months.
Yellow	Lifting accessories, which inspection is due after lapse of 06 months shall be stored separately and clearly marked/ color coded and returned for re-inspection, certification and color coding.
Red	Crimson red color to denote equipment "unsuitable for the job" shall be applied. The crimson red color code shall also be used for discarded or rejected lifting gears that need to be kept in material storage for non-prescribed period of time.

ANNEXURE D

ASSURED GROUNDING COLOR CODES

- All cords and current carrying conductors used with the portable power tools shall be protected by either a Ground Fault Circuit Interrupter (GFCI) or an Assured Grounding Program.
- Following Assured Grounding Color Code Calendar shall be used (each new year):

January	February	March
April	May	June
July	August	September
October	November	December

Note:- The colors in the form of "taped bands" shall be pasted on the wire near the plug.

ANNEXURE E

LOCKOUT COLOR CODING

- Lockout and Tagout (LOTO) devices shall be singularly identified; shall be the only device(s) used for controlling energy; and shall not be used for other purposes.
- Tags shall not be required if locks are otherwise "indelibly" marked so as to identify the person(s) to whom the lock belongs.
- For each Section/ Department, Locks shall be unique-color-coded to assist in identifying users.

Note: *The authorized person applying a lock shall keep the key for that lock in his possession until the lock is removed. No employee should be able to open a lock attached by someone else.*

ANNEXURE F

COLOR CODING FOR WASTE DRUMS/CONTAINERS/BINS

Designated waste drums, containers, bins, etc with specific labels shall be placed as Collection Method for the Waste Generating Areas. Color coding of drums, containers, bins, etc. for various types of wastes is to be as follows:

Waste Type	Bin Color
Hazardous Waste	**Red Color**
Food Waste	**Green Color**
Wood Waste	**Brown Color**
Glass Waste	**Yellow Color**
Plastic Waste	**Blue Color**
Metal Waste	**Grey Color**
Paper Waste	**White Color**

ANNEXURE G

COLOR CODING FOR WORK PERMITS

- Following types of work permits shall generally be in use:-

Permit	Background Colour
Cold Work Permit	Blue Colour
Sour/Hot Work permit	Red Colour
Electrical Work Permit	Green Colour
Confined Space/Vessel Entry Work Permit	Grey Colour
Radiography Work Permit	Yellow Colour
Excavation & Civil Work Permit	Brown Colour
Working at Height Permit	Pink Colour
Vehicle Entry Permit	Purple Colour

ANNEXURE H

COLOR CODING FOR HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

The four bars shall be color-coded, using the modern color bar symbols and the number ratings as follows:

0 = Insignificant hazard;
1 = Slight hazard;
2 = Moderate hazard;
3 = High hazard; &
4 = Extreme hazard

Type of Hazard	HMIS Color Bar
Health	**Blue**
Flammability	**Red**
Physical Hazard	**Orange**
Personal Protection	**White**

Note: *The color bar is not for emergencies and is used to convey broader health warning information.*

ANNEXURE I

TYPES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Category A: The Basic PPE shall include a) Coverall/ Dangri, b) Warm Jacket/ Leather Jacket, c) Safety Shoes, d) Safety Glasses, e) Hard Hat, f) Ear Muffs and g) Cotton Gloves.

Category B: The Specific PPE shall include a) Gloves (Leather, Chemical Resistant, and Latex), b) Face Shields (Welding Shields and Goggles), c) Flame Resistant Clothes, d) Long Safety Shoes, e) Gas Mask, f) Chemical Apron and f) Safety Harness.

Category C: The Emergency PPE shall include complete Turnout Gear / Fire Kit (Fire Suit), SCBA/30 min., Air-Purifying Respirator (APR), and Safety Vests / Clothing with Reflective Material designed for high nighttime visibility.

ANNEXURE J

HAZARDOUS AREA CLASSIFICATION

The classification of areas shall be made an essential design consideration: A thorough analysis shall be undertaken by the responsible designers, chemical or electrical engineers to a) acquire such equipment which is to not create sources of ignition capable of igniting these mixtures and b) determine the correct hazardous locations classification. Process areas at the design phase shall be divided into Zones or Divisions as mentioned below according to the likelihood of a potentially explosive atmosphere being present:

Zone Classification	Definition Of Zone Or Division	Division Classification
Zone 0 (gases)	An area in which an explosive mixture is continuously present or present for long periods **Typically 1000 hr/year**	**Class I Division 1 (gases)**
Zone 1 (gases)	An area in which an explosive mixture is likely to occur in normal operation **Typically 10-1000 hr/year**	**Class I Division 1 (gases)**
Zone 2 (gases)	An area in which an explosive mixture is not likely to occur in normal operation but in accidental events or abnormal operation of equipment **Typically 1-10 hr/year**	**Class I Division 2 (gases)**

Note: *Intrinsically Safe/ explosion proof equipment, apparatus and gadgets shall be used in Zone 0&1.*

ANNEXURE K

EXPLOSION PROOF PROTECTION UNDER ATEX DIRECTIVE

Ex Code		Description	Standard	Area	Use
Flameproof	d	Equipment construction is such that it can withstand an internal explosion and provide relief of the external pressure via flamegap(s) such as the labyrinth created by threaded fittings or machined flanges. The escaping (hot) gases must sufficiently cool down along the escape path that by the time they reach the outside of the enclosure not to be a source of ignition of the outside, potentially ignitable surroundings.	IEC./EN 60079-1	Zone 1 if gas group & temp. class correct	Motors, lighting, junction boxes, electronics
Increased Safety	e	Equipment is very robust and components are made to a high quality	IEC/EN 60079-7	Zone 2 or Zone 1	Motors, lighting, junction boxes

Pressurised/purged	Encapsulated	Sand/Powder/Quartz Filled	Oil Filled
p	m	q	o
Equipment is pressurised to a positive pressure relative to the surrounding atmosphere with air or an inert gas, thus the surrounding ignitable atmosphere can not come in contact with energized parts of the apparatus. The overpressure is monitored, maintained and controlled.	Equipment components of the equipment are usually encased in a resin type material	Equipment components are completely covered with a layer of Sand, powder or quartz	Equipment components are completely submerged in oil
IEC/EN 60079-2	IEC/EN 60079-18	IEC/EN 60079-5	IEC/EN 60079-6
Zone 1 (px or py), or zone 2 (pz)	Zone 1 (Ex mb) or Zone 0 (Ex ma)	Zone 2 or Zone 1	Zone 2 or Zone 1
Analysers, motors, control boxes, computers	Electronics(no heat)	Electronics, telephones, chokes	Switchgear

Intrinsically safe	**i**	Any arcs or sparks in this equipment has insufficient energy (heat) to ignite a vapour Equipment can be installed in ANY housing provided to IP54. A 'Zener Barrier', opto-isolator or galvanic unit may be used to assist with certification. A special standard for instrumentation is IEC/EN 60079-27, describing requirements for Fieldbus Intrinsically Safe Concept (FISCO) (zone 0, 1 or 2)	IEC/EN 60079-25 IEC/EN 60079-11 IEC/EN60079-27	'ia': Zone 0 & 'ib': Zone 1 'ic: zone 2	Instrumentation, measurement, control
Non Incendive	**n**	Equipment is non-incendive or non-sparking. A special standard for instrumentation is IEC/EN 60079-27, describing requirements for Fieldbus Non-Incendive Concept (FNICO) (zone 2)	IEC/EN 60079-15 IEC/EN 60079-27	Zone 2	Motors, lighting, junction boxes, electronic equipment

ANNEXURE L

NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS) (SELF MONITORING AND REPORTING BY INDUSTRY) RULES 2001, SRO 528(1)/2001

1. Quarterly basis, monitoring of Effluents for the given parameters and reporting to provincial EPA:

(i) Flow
(ii) pH = 6 – 9
(iii) Temperature Increase = < 3 C
(iv) BOD5 = 80 mg/l
(v) COD = 150 mg/l
(vi) TSS = 200 mg/l
(vii) TDS = 3500 mg/l
(viii) Oil/Grease = 10 mg/l
(ix) Phenol = 0.1 mg/l
(x) Chloride = 1000 mg/l

2. Quarterly basis, monitoring of Emissions for the given parameters and reporting to provincial EPA:

(i) CO = 800 mg/Nm3
(ii) Hydrogen Sulphide = 10 mg/Nm3
(iii) PM10 = 300 mg/Nm3
(iv) SOx = 400 mg/Nm3

(Based on one percent sulphur content in fuel oil.)

(v) NOx = 130 nanogram per joule of heat input

3. Annual basis, monitoring of Diesel Vehicle Exhausts:

(i) CO = 4.0 g/kWh [ECE R-49] for Trucks and Buses + Large good vehicles + Older Vehicles
(ii) HC = 1.1 g/kWh [ECE R-49] for Trucks and Buses
(iii) HC = 7.0 g/kWh [ECE R-49] for Large good vehicles and Older Vehicles
(iv) NOx = 7.0 g/kWh [ECE R-49 for Trucks and Buses
(v) NOx = 1.1 g/kWh [ECE R-49] for Large good vehicles and Older Vehicles
(vi) PM = 0.15 g/kWh [ECE R-49] for Trucks and Buses + Large good vehicles + Older Vehicles

4. Annual basis, monitoring ambient air quality (due to flare/ vent):

Sulphur Dioxide (SO_2)	Annual Average* = 80 ug/m^3 24 hours** = 120 ug/m^3	Ultraviolet Fluorescence method
Oxides of Nitrogen as (NO)	Annual Average* = 40 ug/m^3 24 hours** = 40 ug/m^3	Gas Phase Chemiluminescence
Oxides of Nitrogen as (NO_2)	Annual Average* = 40 ug/m^3 24 hours** = 80 ug/m^3	Gas Phase Chemiluminescence
O_3	1 hour = 180 ug/m^3	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average* = 400ug/m^3 24 hours** = 550ug/m^3	High Volume Sampling, (Average flow rate not less than 1.1 m^3/minute)
Respirable Particulate Matter.PM_{10}	Annual Average* = 200ug/m^3 24 hours** = 250ug/m^3	B Ray absorption method
Respirable Particulate Matter. $PM_{2.5}$	Annual Average* = 25 ug/m^3 24 hours** = 40 ug/m^3	B Ray absorption Method
Lead (Pb)	Annual Average* = 1.5 ug/m^3 24 hours** = 2 ug/m^3	ASS Method after sampling using EPM 2000 or equivalent Filter Paper
Carbon Monoxide (CO)	8hours** = 5 mg/m^3 1 hour** = 10 mg/m^3	Non Dispersive Infra Red (NDIR) method

* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.
** 24 hourly /8 hourly values should be met 98% of the time in a year. 2% of the time, it may exceed but not on two consecutive days.

5. Quarterly basis, monitoring noise levels:

Noise –dB(A) Leq* 55 (Day Time); 45 (Night Time)	Residential Camp Area
Noise –dB(A) Leq* 75 (Day Time); 65 (Night Time)	Engine Hall, Plant Premises

1. Day time hours: 6.00 a.m to 10.00 p.m.
2. Night time hours: 10.00 p.m. to 6.00 a.m.
3. Silence zone: Zone which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.
4. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.

*dB(A) Leq: Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

6. National Standards for Drinking Water Quality

#	Properties/ Parameters	Standard Values
Bacterial		
1.	All water intended for drinking (E.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100 ml sample
2.	Treated water entering the distribution system (E.Coli or thermotolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample
3.	Treated water in the distribution system (E.coli or thermotolerant coliform and total coliform baceria)	Must not be detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.

Physical		
4.	Colour	≤ 15 TCU
5.	Taste	Non objectionable/ Acceptable
6.	Odour	Non objectionable/ Acceptable
7.	Turbidity	< 5 NTU
8.	Total Hardness as $CaCO_3$	< 500 mg/l
9.	TDS	< 1000
10.	pH	6.5-8.5
Radioactive		
11.	Alpha Emitters bq/L or pCi	0.1
12.	Beta emitters	1
Che□ical		
	Essential Inorganics	*mg/Litre*
13.	Aluminum (Al) mg/l	≤0.2
14.	Antimony (Sb)	≤0.005
15.	Arsenic (As)	≤0.05
16.	□arium (Ba)	0.7
17.	Boron (B)	0.3
□8.	Cadmium (Cd)	0.01
19.	Chloride (Cl)	<250
20.	Chromium (Cr)	≤0.05
21.	Copper (Cu)	2
Toxic		
	Toxic Inorganics	*mg/Litre*
22.	Cyanide (CN)	≤0.05
23.	Fluoride (F)*	≤1.5
24.	Lead (Pb)	≤0.05
25.	Manganese (Mn)	≤0.5
□6.	Mercury (Hg)	≤0.001
27.	Nickel □Ni)	≤0.02
28.	Nitrate (NO3)*	≤50
29.	Nitrite (NO2)*	≤3
30.	Selenium (Se)	0.01
31.	Residual ch□orine	0.2 – 0.5 at consumer end 0.5-1.5 at source
32.	Zinc (Zn)	5.0

7. Light Intensity

To assess whether lighting is sufficient in workplace, following light intensity ranges are used. Employees should understand the effects of lighting on their health and safety. In particular, they need to understand visual fatigue: its causes, prevention, symptoms, and recovery techniques.

Task/ Area	Range of Luminance (Lux)
Emergency lighting (at floor or tread levels) in exits, exit routes, stairs, and underground walkways	At least 10 (on average)
Simple visual tasks e.g. lobby area; washrooms; loading into trucks	30 – 100
Medium visual tasks e.g. bookkeeping; filing; material receiving and packing areas	300 – 1000
More visually demanding tasks e.g. QC/ inspection; proofreading; workshops/ machine work	3000 – 10000

ANNEXURE M
EMERGENCIES LEVELS

Basic Level Emergency	It is an emergency state in which an incident occurs which may not cause the normal operations to be shutdown. There is no immediate potential threat to the safety of personnel, assets, environment, and operations. Emergency equipment available on site can control this type of emergency situation. For e.g. • An injury or illness without Lost Workday Injury (LWI); • Minor fire; • Minor spill; • Electrical shock; • Person becomes unconscious in confined space. **Note:** For Basic Level Emergency condition, there is no need to gather at muster point.
Level – 1 Emergency	It is an emergency state in which an incident or series of Incidents which may cause the normal operations / activities to be temporary suspended or shut down. This emergency results an immediate potential threat to the safety of personnel, assets, environment, and operations. This type of emergency can be control by Emergency Team Member. The following conditions define as Level-1Emergency (but not limited to): • An injury or illness which result Lost Workday Injury (LWI); • Moderate fire; • Moderate spill; • Small contained fire or explosion; • Electric shock/ electrocution; • Toxic/ H2S leakage; **Note:** Gather at respective muster point in case of Level-1 Emergency.

Level- 2 Emergency	An emergency state in which an incident or series of incident may result in serious injury/ fatality, significant fire/ explosion, major equipment damage, gas / oil release, loss of controlled substance to the environment for which external support services may be required. The following condition defines as Level-2 Emergency (but not limited to): • An injury or illness that may result in Lost Workday Injury (LWI) or poses a health threat to personnel; • Property or Equipment damaged due to the significant fire or explosion; • Excessive H_2S emission; • Major fire/ explosion; • Major chemical / oil spills; • Bomb threat; • Natural disaster **Note:** Rush outside the plant boundary through emergency exit gate in case of Level-2 Emergency.

ANNEXURE N

WELLSITE CLASSIFICATION ACCORDING TO AREAS OF POTENTIAL AND/OR ACTUAL EXPOSURE TO H2S

No Hazard Condition	Any well that will not penetrate a known Hydrogen Sulfide formation would be categorized as a "No Hazard Area". Special Hydrogen Sulfide equipment is not required.
API Condition I - Low Hazard	*Work locations where atmospheric concentrations of H_2S are less than 10ppm.* Recommended for Area: - Hydrogen Sulfide warning sign with GREEN FLAG warning device present. - Keep all safety equipment in adequate working order. - Store the equipment in accessible locations.

API Condition II - Medium Hazard	*Work locations where atmospheric concentrations of H_2S are greater than 10ppm and less than 30ppm.*
	Recommended for Area:
	- Legible Hydrogen Sulfide warning sign with YELLOW FLAG warning device present.
	- Keep a safe distance from dangerous locations if not working to decrease danger.
	- Pay attention to audible and visual alarm systems.
	- Follow the guidance of the operator representative.
	- Keep all safety equipment in adequate working order.
	- Store the equipment in accessible locations.
	  - An oxygen resuscitator.
	  - A properly calibrated, metered hydrogen sulfide detection instrument.

API Condition II - Medium Hazard

Work locations where atmospheric concentrations of H_2S are greater than 30ppm.

Recommended for Area:

- Post legible Hydrogen Sulfide warning sign with RED FLAG warning device.
- Post signs 500 feet from the location on each road leading to the location, warning of the hydrogen sulfide hazard.
- Check all Hydrogen Sulfide safety equipment to ensure readiness before each tour change.
- Establish a means of communication or instruction for emergency procedures and maintain them on location, along with contact information of persons to be informed in case of emergencies.
- Ensure usability of two exits at each location.
- Do not permit employees on location without hydrogen Sulfide safety training. (Employees may be permitted on location for specific Hydrogen Sulfide training purposes that does not include general rig training.)
- Pay attention to audible and visual alarm systems.
- Store the equipment in accessible locations.
  - Two Hydrogen Sulfide detectors should be present (one should be a properly calibrated, metered detection instrument, and the other should be a pump type with detector tubes. The maximum permissible exposure limit (PEL) is 20 ppm. Respiratory protection would be required if periodic testing indicates employee exposures to H_2S at concentrations above the PEL. Ref. OSHA Standard Respiratory Protection, [29 CFR 1910.134].
  - Oxygen resuscitator.
  - Three wind socks and streamers.
  - Two NIOSH/MSHA 30-minute, Self-Contained Breathing Apparatus (SCBA) for emergency escape from the contaminated area only.

ANNEXURE O
PRE-DRILLING CIVIL WORKS CHECKLIST

- ☐ DISTANCE FROM METAL ROAD TO RIG.
- ☐ DISTANCE FROM RIG TO LOCATION.
- ☐ CONDITION OF KATCHA ROAD FOR HEAVY LOADS.
- ☐ WATER SOURCE CANAL / RIVER / ETC.
- ☐ STATUS OF WATER LINE.
- ☐ DISTANCE FROM WATER PUMPING STATION TO RIG.
- ☐ PUMPS + MOTORS INSTALLED AT THE WATER STORAGE POND, IF WATER PUMPED TO RIG / CAMP SITE.
- ☐ COMPACTION IN RIG AND CAMP AREA.
- ☐ FENCING ANGLE IRONS GROUNDED.
- ☐ CHECK IF ANY AREA IS OPEN / UN-SAFE.
- ☐ FENCING WORK STATUS. REQUIRED BARBED WIRE 8 FEET HIGH.
- ☐ SNAKE SHEET 4 FEET HIGH ALL AROUND CAMP & RIG SITE.
- ☐ CHECK WIND DIRECTION TO SELECT RESIDENTIAL CAMP. CAMP SHOULD BE OPPOSITE WIND DIRECTION & 500M AWAY FROM RIG.
- ☐ STATUS OF WATER LINE FROM RIG SITE BATHROOMS + LIVING CARAVANS.
- ☐ CELLAR TO BE EXCAVATED 20 FEET DEEP FOR 30" CONDUCTOR.
- ☐ AFTER CONCRETING CELLAR BOTTOM = 10 FEET.
- ☐ MUD WASTE PIT STATUS.GEO-MEMBRANE REQUIRED AT WASTE PIT.
- ☐ RIG FOUNDATION AND DRAINS AROUND CELLAR.
- ☐ TWO TOILETS + BATHS AT RIG SITE.
- ☐ DON'T CONCRETE RAT HOLE IN RIG FOUNDATION AS PER DRAWING.
- ☐ DRAINAGE SLOPE SHOULD NOT BE TOWARDS MUD WASTE PIT.
- ☐ CAMP & RIG SITE CARAVAN'S FOUNDATION PADS.
- ☐ 10' x 40' GATE AT MAIN ENTERANCE. ALSO ONE SMALL GATE 4' x 10' AS BIG GATE WILL BE LOCKED DURING NIGHT.
- ☐ ONE SMALL GATE OPPOSITE MAIN GATE FOR EMERGENCY ESCAPE.
- ☐ ARRANGEMENTS FOR QUICK WATER CONNECTIONS (BALL VALVE + NIPPLE + HOSE) FOR LIVING CARAVANS.
- ☐ CHECK POST FOR OGDCL SECURITY AT MAIN ENTERANCE.
- ☐ ELECTRICITY FITTINGS IN SECURITY ROOM AND F.C ROOMS.
- ☐ WHITEWASH & PAINT RIG SITE BATHS, F.C ROOMS, SECURITY ROOM
- ☐ SEWERAGE LINE TO CONNECT LIVING ROOMS DRAINS TO MAIN SEPTIC TANK.
- ☐ FENCING AROUND MAIN SEPTIC TANKS AREA
- ☐ DOUBLE LINES FITTINGS IN RIG SITE BATHROOMS WITH GEYZERS.
- ☐ CONSTRUCTION OF FOUR ROOMS + KITCHEN + BATH FOR F.C.
- ☐ ONE EXTRA W.C TO BE FITTED IN F.C BATHROOM.
- ☐ PLACE FOR MASJID.

IMPORTANT CONTACT NUMBERS

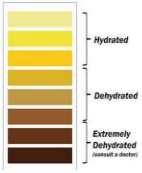
#	Designation	Contact #s		
		Office	Residence	Cell

Oil & Gas Development Company Ltd.

HSE INDUCTION FOR FIELD VISITORS

[to be placed or posted in every guest room]

1. Please note that the major hazards of this field/ location are of physical, chemical, and biological nature.
2. Therefore, visitors are expected to comply with all SAFETY/ ENVIRONMENT/ EMERGENCY signs and use of PPE where required.
3. In case of any emergency, inform Duty Officer by dialing 'xxx'.
4. Actions in the event of Fire or Fire Alarm:
   - If fire is detected, inform Duty officer.
   - If fire alarm sounds; Switch off any electrical/ gas appliance in use; Close doors/ windows.
   - Evacuate through the nearest Fire Exit and proceed to Muster Point.
   - Do not attempt to gather your personal belongings.
   - Do not go to the places other than the Muster Point.
   - Return to the office/ plant/ camp when allowed by Security Administrator.
5. Only use the designated areas for smoking.
6. Visitor's responsibilities towards Environment:
   - Do not litter; Use the designated waste bins.
   - Switch off the lights, fan, air conditioner, and heater when not needed.
   - Report any spark in the switch boards and water leakage in the toilets.
   - Do not use tap water for drinking.
7. Please avoid wearing open shoes or sandals while going out of the camp/ field area, since presence of snakes or poisonous insects cannot be ruled out. In case of snake/ insect bite, please call medical emergency at xxx. Necessary medicines are available at field.
8. Illegal drugs, weapons and explosives are prohibited within office/ plant/ camp premises.
9. While using toilets, you may consult the following Dehydration Chart to check your dehydration levels through urine color:



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