

HEALTH / SAFETY / ENVIRONMENTAL (HSE) HANDBOOK

**All AVENTA employees must understand the contents of this HSE handbook**

## Table of Contents

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>6</b>
<b>2.0</b>	<b>AVENTA WORKPLACE PRINCIPLES AND POLICIES.....</b>	<b>6</b>
2.1	Professional Conduct.....	6
2.2	Drugs, Alcohol and Weapons.....	6
2.3	Housekeeping.....	6
2.4	Smoking.....	6
2.5	Adverse Weather Conditions.....	7
2.6	Security.....	7
2.7	Fire Prevention.....	7
2.8	Emergency Response and Drills.....	7
<b>3.0</b>	<b>HSE MEETINGS.....</b>	<b>7</b>
3.1	Scheduled HSE Meetings.....	7
3.2	Pre-Job HSE Meetings.....	8
<b>4.0</b>	<b>PERSONAL PROTECTIVE EQUIPMENT (PPE).....</b>	<b>8</b>
4.1	General.....	8
4.2	Head Protection.....	8
4.3	Eye Protection.....	8
4.4	Foot Protection.....	9
4.5	Hand Protection.....	9
4.6	Hearing Protection.....	9
4.7	Protective Clothing.....	9
4.8	Fall Protection.....	9
4.8.1	Working Above Six (6) Feet.....	10
4.8.2	Care and Inspection of Fall Protection Equipment.....	10
4.8.3	Lifting of Personnel with Air Hoist or Hydraulic Winch.....	10
4.8.4	Fall Protection During Onshore Rig Moves.....	11
4.8.5	Guard / Hand Rails & Barricading.....	11
4.8.6	Ladders.....	12
4.8.7	Tank Roofs.....	12
4.9	Respiratory Protection.....	12
4.10	Personal Flotation Devices (PFD's) .....	12
<b>5.0</b>	<b>TRANSPORTATION .....</b>	<b>13</b>
5.1	Vehicles.....	21
5.2	Boats.....	22
5.3	Helicopters.....	22
<b>6.0</b>	<b>OFFSHORE (WATER) SAFETY.....</b>	<b>14</b>
6.1	Swimming Requirements.....	14
6.2	Personnel Entry Into Water.....	14
6.3	Boat-Platform Transfers.....	14
6.4	Loading Equipment on Barges.....	14
6.5	Fire and Abandonment Drills.....	14
<b>7.0</b>	<b>ENVIRONMENTAL.....</b>	<b>15</b>

7.1 ISO 14001.....	15
7.2 Environmental Assessment.....	15
7.3 Spill (SPCC) Plans.....	15
7.4 Waste Management.....	15
7.5 Environmental Rules, Regulations, and Guidelines.....	15
<b>8.0 OCCUPATIONAL HEALTH.....</b>	<b>16</b>
8.1 General.....	16
8.2 Use of Prescription and Over-the-Counter (OTC) Medications.....	16
8.3 Medical Response Plan.....	16
8.4 Hazard Communication (HAZCOM) / MSDS Program.....	16
8.5 Naturally Occurring Radioactive Material (NORM).....	16
8.6 Asbestos.....	17
8.7 Man-Made Mineral Fibers (MMMMF) .....	17
8.8 Lead.....	17
8.9 Heat and Cold Stress.....	17
8.10 Food Control.....	17
<b>9.0 PERMIT-TO-WORK (PTW) PROCESS.....</b>	<b>17</b>
9.1 General.....	17
9.2 Work Permit.....	18
9.3 JSA/JHA.....	18
<b>10.0 MANAGEMENT OF CHANGE (MOC) PROCESS.....</b>	<b>19</b>
<b>11.0 PROCESS SAFETY MANAGEMENT (PSM) .....</b>	<b>19</b>
<b>12.0 GENERAL OPERATIONS.....</b>	<b>19</b>
12.1 HSE in the Office.....	19
12.2 Lifting of Loads by Personnel.....	19
12.3 Lockout / Tagout.....	20
12.4 Confined Space Entry.....	20
12.5 Hot Work.....	22
12.5.1 Hot Tapping.....	22
12.5.2 Fire Protection During Hot Work Operations.....	22
12.5.3 Ventilation During Hot Work Operations.....	23
12.6 Electrical Safety.....	23
12.6.1 Electrical Safe Work Practices.....	23
12.6.2 Power Lines.....	23
12.7 Static Electricity.....	24
12.8 Operating Equipment.....	24
12.9 Crane, Gin Pole and Rigging Safety.....	25
12.9.1 Procedure for Using Tag Lines.....	26
12.9.2 Use of a Crane to Hoist Personnel.....	26
12.10 Excavation and Trenching.....	26
12.10 Scaffolding Safety.....	26
12.11 Sandblasting and Painting.....	26
12.11.1 Sandblasting.....	27
12.11.2 Painting.....	27
12.12 Compressed Air Used for Cleaning.....	27
12.13 Use Of Cheater Bars/Pipes.....	27

12.14	Forklift Safety.....	27
12.15	Use of Hand and Power Tools.....	28
<b>13.0</b>	<b>DRILLING AND WELL SERVICING OPERATIONS .....</b>	<b>28</b>
13.1	General.....	28
13.2	Underground Lines.....	29
13.3	Rig Equipment Grounding.....	29
13.4	Mismatched Hammer Unions.....	30
13.5	Tubular Handling.....	30
13.5.1	Tubular Loading and Unloading.....	30
13.5.2	Pipe Racks.....	31
13.5.3	Rig Floor Tools for Running Tubulars.....	31
13.5.4	Casing Crews.....	32
13.6	Above-Ground Pressurized Lines.....	32
13.7	Cementing.....	32
13.8	Perforating and Other Wireline Operations Involving Explosives.....	32
<b>14.0</b>	<b>SEISMIC OPERATIONS.....</b>	<b>33</b>
14.1	Electrical Storms.....	33
14.2	Battery Charging.....	33
<b>15.0</b>	<b>MINIMUM EQUIPMENT SPACING REQUIREMENTS.....</b>	<b>33</b>
<b>16.0</b>	<b>HAZARDOUS ATMOSPHERES.....</b>	<b>33</b>
16.1	Hydrogen Sulfide (H <sub>2</sub> S) .....	33
16.2	Carbon Dioxide (CO <sub>2</sub> ) and Nitrogen (N <sub>2</sub> ) .....	35

## 1.0 INTRODUCTION

AVENTA is committed to a safe workplace, the protection of the environment and health (HSE) for all AVENTA's employees. However, your help will be needed to accomplish this objective. AVENTA believes that HSE is a team effort and the responsibility of all - it will take everyone working together to reduce and eliminate HSE incidents.

This Health, Safety and Environmental (HSE) Handbook is a guide to your responsibilities on the job you will have to operate. This handbook outlines the minimum expectations you shall comply with while working on AVENTA premises. Of course, good judgment and clear thinking are required to supplement any rules. HSE shall be a core value in all work performed for AVENTA. If you are in doubt at any time whether the health, safety, and/or environmental aspect of the operation at hand are being properly managed, stop the work and consult your supervisor or the representative. It is your duty to report conditions that could lead to an HSE incident and to stop the operation immediately until conditions are fixed or safeguarded. In addition, you are required to report all HSE incidents, including accidents and injuries, as soon as possible to your supervisor or the representative.

## 2.0 AVENTA WORKPLACE PRINCIPLES AND POLICIES

### 2.1 Professional Conduct

While on AVENTA premises, each employee shall conduct themselves in a professional manner - horseplay, practical jokes, or any type of harassment is not allowed. This includes sexual harassment, which will not be tolerated on AVENTA premises. Male and female employees are entitled to a workplace free from sexual harassment. Sexual harassment includes unwelcome sexual advances, requests for sexual favors, threats, actual bodily contact, and other verbal or physical conduct of a sexual nature which interferes with an individual's work performance or creates an intimidating, hostile or offensive working environment.

### 2.2 Drugs, Alcohol and Weapons

The use, possession, transportation, promotion or sale of illegal drugs, controlled substances, drug paraphernalia, alcohol, firearms or weapons while on AVENTA premises, whether owned or leased, is absolutely prohibited. Use of prescription or over-the-counter (OTC) medications that may impair your ability to work safely shall be discussed with your supervisor before beginning work.

### 2.3 Housekeeping

All walking areas, work areas, handrails, equipment, tools, fire- fighting and life-saving equipment, etc. shall be kept clean and free of obstructions. Good housekeeping is essential so work may proceed in a safe and orderly manner. Tools should be placed appropriately as to not cause a hazard to the job at hand while in use and promptly put away after use. Hand and power tools shall be kept in good condition with guards in place without modification defective tools shall be repaired by qualified repairpersons or replaced. When cleaning grease from equipment and tools, detergents and water or steam are preferable over solvents from an HSE standpoint. Only approved solvents shall be used and gasoline is not allowed for cleaning.

### 2.4 Smoking

Smoking, matches or lighters are only allowed in designated smoking areas. In addition, they are not allowed in or around helicopter landing areas or while in flight unless the

pilot has given permission. Only safety matches (no "strike-anywhere" matches) or lighters with the sparking mechanism enclosed (no disposable lighters) are permitted.

## 2.5 Adverse Weather Conditions

When adverse weather conditions present a potential risk to HSE, AVENTA expects good judgment to be used and action taken, up to and including shutting down the job, to protect HSE.

## 2.6 Security

Bear in mind that Operator or Contractor shall be responsible for their own equipment and held accountable for controlling the actions of their employees.

Cameras are not permitted on location without prior approval of the representative.

## 2.7 Fire Prevention

Approved explosion proof equipment shall be used in all offshore locations and any other location where flammable mixtures may be present. When handling flammable materials, smoking, open flames, or electric arcs are prohibited. All combustion engines should be shut down before fueling except when the refueling location is sufficiently removed from the engine. Extreme caution should be followed in areas where flammable vapors are present or suspected.

Combustible materials such as rags, paper, and trash shall be disposed of in proper containers and the containers labeled. Flammable liquids such as gasoline, kerosene, fuel oil, etc. shall be transported and stored only in approved metal containers and the containers labeled.

Fire fighting equipment shall not be altered, tampered with or blocked. All employees are expected to be familiar with the location of the portable fire extinguishers and emergency response plan, including fire alarms, and participate in fire drills.

## 2.8 Emergency Response and Drills

AVENTA employees shall be familiar with emergency response plans for the location, including facility and plant alarms, and shall participate in emergency drills.

Offshore Specific - Usually, emergency evacuation drills is conducted monthly for each crew working offshore. Instructions are outlined in the "Station Bill" in each living quarters. It is your duty to read, review and understand the posted "Station Bill".

## 3.0 HSE MEETINGS

### 3.1 Scheduled HSE Meetings

Usually regularly scheduled (minimum monthly) HSE meetings shall be conducted by each contractor or operators and attended by all personnel. Topics may include HSE issues; regulatory issues; HSE training; HSE trends that have been identified; etc. A record of these meetings shall be kept that includes date, location, names/signatures of attendees, and topics covered.

## 3.2 Pre-Job HSE Meetings

A pre-job or pre-task HSE meeting shall be conducted on-site prior to beginning all work in which the specific hazards pertaining to the job are discussed. Additional meetings may be required throughout the same day in the event a non-routine job is performed, in order to review a JSA or work permit prior to beginning a specific task, or in the event a change in job scope occurs. Everyone shall attend and participate in all HSE meetings unless specifically instructed otherwise. A record of these meetings shall be kept that includes date, location, names/signatures of attendees, and topics covered.

Suggested Topics for a Pre-Job HSE Meeting:

- Tasks - Discuss the task and job steps.
- PPE - Discuss what PPE is needed for the job.
- Responsibilities - Establish who has the overall responsibility for the job and ensure that each individual understands their assignment.
- Skills - If special job skills are needed for a task, ensure proper training has been provided. Discuss SSE's and how they will be managed.
- Emergency Evacuation - Discuss gather-up point, evacuation route, nearby hospitals, who are the first responders, etc.
- Environment - Discuss weather (heat, cold, wind, lightning, etc.) and location hazards such as snakes, insects, uneven walking surfaces, etc.
- Hazards - Discuss any location or job hazards not previously discussed in other portion of HSE meeting or during review of JSA or Work Permit.
- Equipment - Discuss any special tools that will be needed for a task and the HSE aspects of their usage including proper PPE.
- Materials - Discuss HSE aspects associated with materials including proper PPE and review MSDS if appropriate.
- Conflicting Activities - Discuss other activities or simultaneous operations (SIMOPS) that may affect the operation.

## 4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

### 4.1 General

All employees working on site shall wear appropriate personal protective equipment (PPE). PPE requirements as recommended on Material Safety Data Sheets (MSDS) for material being handled shall be strictly adhered to. In addition, all employees working on site shall wear a shirt and long pants at all times. Tank tops, sleeveless shirts, and short pants or cutoffs are not permitted. Loose or floppy clothing is prohibited around rotating or moving equipment. Rings, neck chains or loose jewelry shall be removed while engaging in manual labor.

### 4.2 Head Protection

An approved ANSI Z89.1 Class B (plastic) hard hat shall be worn by all employees working in field operations at all times except while in

vehicles, living quarters, offices and control rooms. While using All Terrain Vehicles (ATV's), such as during seismic operations, an approved helmet shall be worn in place of a hard hat.

### 4.3 Eye Protection

Safety glasses with side shields shall be worn by all employees working in field operations at all times except while in vehicles, living quarters, offices and control rooms. All eye



protection must comply with site rules. During night operations, only clear or amber colored safety glasses shall be worn. Contact lenses may be worn; however, safety glasses with side shields are required.

When performing work where safety glasses do not provide adequate protection, such as use of high-pressure washer, handling chemicals, etc. other appropriate eye protection such as goggles, etc. shall be worn. Hard hats with full-face shields will be required for all buffing and grinding operations.

**Welding Specific** - Welding hoods shall be used during all arc- welding operations. Goggles or other suitable eye protection with appropriate filter lenses shall be used during all gas welding, gas cutting or brazing operations. All filter lenses and plates used in welding hoods and goggles shall meet the test for transmission of radiant energy. Welders' helpers and entry attendants shall use proper eye protection. When not engaged in a welding or cutting activity, safety glasses with side shields will be worn by welders and welders' helpers.

#### 4.4 Foot Protection

Steel toe or a non-conductive (electrician's) safety toe shoes or boots with non-skid soles shall be worn by all employees working in field operations at all times except while in vehicles, living quarters, offices and control rooms. All safety toe footwear must comply with site requirements.

#### 4.5 Hand Protection

Appropriate gloves shall be worn when the hands are exposed to hazards such as cuts, punctures or abrasions (cloth, leather or leather-palmed gloves); when handling chemicals or hazardous materials where absorption is a concern (rubber gloves); and when performing electrical work (certified gloves for electrical work).

**Welding Specific** - Flameproof gauntlet gloves shall be used during all arc welding, gas welding or gas cutting operations except when engaged in light work such as test fitting pieces.

#### 4.6 Hearing Protection

Hearing protection shall be worn in all high noise areas or wherever a high-noise warning sign is posted.

#### 4.7 Protective Clothing

Special protective clothing shall be worn when handling chemicals or in other hazardous situations as specified by the Material Safety Data Sheet (MSDS). Clothing worn while working on live electrical equipment shall be 100% cotton, wool or a cotton-wool blend.

During seismic field operations, all personnel shall wear high-visibility work vests, preferably fluorescent orange in color.

#### 4.8 Fall Protection

Fall protection equipment shall be worn when working or climbing more than six (6) feet above an established working surface (ground, deck or water level); when specified on a warning sign; or when an immediate danger exists below the working surface regardless of height and no guard rails are present.

#### 4.8.1 Working Above Six (6) Feet

Any employee working or climbing more than six (6) feet above an established working surface (ground, deck or water level) shall use one of the following means for primary fall protection:

- The preferred system for primary fall protection consists of:
  - (a) a full body harness; (b) shock absorber; (c) clevis with cotter pin locking device or snap hooks with an inward moving, self-closing, and self-locking keeper (latch or gate) so that keeper remains closed and locked until unlocked and pressed open for connection or disconnection; and (d) nylon lanyard (steel or rope lanyards are not allowed) attached to a stationary support. The lanyard will be attached to a stationary support in a manner that will prevent a free fall of more than six (6) feet or even less than six (6) feet if an immediate danger exists below the working surface regardless of height.
- A retractable lifeline (inertia reel) attached to a full body harness may be used with appropriate site approval.
- A cable-grabbing device attached to a static line may be used with appropriate site approval.
- When ascending or descending a derrick ladder, and using the derrick climbing line run through a fall arresting device and connected to a counterweight, the derrick belt must be used in conjunction with the full body harness. The derrick belt should be worn over the full body harness and attached to the derrick climbing line.
- A double lanyard climbing method shall be used with appropriate site approval if none of the above-described primary fall protection devices are available.

#### 4.8.2 Care and Inspection of Fall Protection Equipment

Fall protection devices such as full body harnesses, lanyards, static lines with cable-grabbing device, inertia reels, etc. shall be inspected before each use and replaced if necessary.

Fall protection equipment, which has been involved in a fall, shall be replaced.

Full body harnesses and lanyards shall be kept clean and never laid down in drilling mud, water, dirt, etc. All fall protection equipment shall be placed in a proper storage area when not in use. Only approved cleaning products for full body harnesses and lanyards shall be used in order to not diminish the rated capacity of the device.

#### 4.8.3 Lifting of Personnel with Air Hoist or Hydraulic Winch

Work procedures requiring personnel to be lifted on an air hoist or hydraulic winch line shall be avoided as much as possible by redesigning the work procedure, equipment, etc. However, there will be certain circumstances, especially in drilling and well servicing operations, which will require personnel to ride an air hoist or hydraulic winch line. The following procedures shall be adhered to during personnel lifts on an air hoist or hydraulic winch line:

- Primary Fall Protection – The rider shall wear a full body harness designed for lifting personnel. The full body harness shall comply with site requirements and have certification that states that the harness meets or exceeds the load weight that may be imposed on it. The personnel lifting hook shall either be a clevis with a cotter pin locking device or a snap hook design with an inward moving, self-closing, and self-locking keeper (latch or gate) and will be attached to the front of the full body harness. Knots used in chains for lifting personnel are prohibited.
- The air hoist and/or hydraulic winch shall be specifically designed and certified for personnel lifting. It shall have a self-centering control that, when released, returns to a positive locking/braking action in a center position. Freewheeling air hoists or hydraulic winches are prohibited. Air or hydraulic power shall be necessary to operate the hoist in

either direction. Use of catheads or catlines for lifting personnel are prohibited. A shut-off valve that is easily accessible by the operator shall be attached to the air hoist and/or hydraulic winch.

- Secondary Fall Protection – Secondary fall protection is required for personnel riding an air hoist or hydraulic winch in the derrick of a rig and/or in situations where it is necessary to unhook to change locations. Secondary fall protection shall be in the form of a static line with a cable- grabbing device attached or a sala block (inertia reel or retractable lifeline) and will be attached to the back of the full body harness.
- All components of the personnel lifting system including cables, air hoists or hydraulic winches, connections, full body harnesses and lifting hooks shall be inspected before each use and replaced if necessary.
- The lifting cable shall utilize factory-installed wire rope clamps and thimbles.
- All of the referenced hoisting equipment and devices shall have a minimum workload of 4,000 pounds.
- Lifting personnel on an air hoist or hydraulic winch line while the line is carrying another load is prohibited.
- Rotating equipment shall not be engaged while lifting personnel on an air hoist or hydraulic winch line.
- There shall be visual contact between the operator of the air hoist and/or hydraulic winch and the person being lifted at all times.
- The operator of the air hoist and/or hydraulic winch shall remain at the controls at all times while lifting, suspending or lowering personnel.
- An easily accessible emergency power isolation control shall be attached to the air hoist and/or hydraulic winch.

#### 4.8.4 Fall Protection During Onshore Rig Moves

Some specific areas where fall protection must be worn during onshore rig moves are:

- When the permanent guardrails on the rig floor are removed during rig down and when rigging up, temporary guardrails such as properly strung cable shall be installed (cable should be installed prior to removing the permanent guardrails). If it is not possible to install temporary guardrails, a full body harness with a shock- absorbing lanyard attached to a stationary support as described in 4.8.1 above shall be used.
- When dismantling the derrick and substructure, fall protection will be continually used. This may be accomplished by:
  - ◇ Use of man-lifts
  - ◇ Use of a cable-grabbing device attached to a static line that is properly secured inside the derrick mast
  - ◇ Use of inertia reel, double lanyard climbing method, or properly secured portable ladder to safely access the derrick
  - ◇ Providing a retractable stand to connect and disconnect derrick-raising lines on A-frame type rigs.

#### 4.8.5 Guard / Hand Rails & Barricading

Guard / Hand rails and or barricading shall be provided for:

- A walkway or wall opening from which there is a drop of more than four (4) feet.
- An open-sided working surface from which there is a drop of more than six (6) feet. Vee-doors on rig floors is one such example and should have a guard rail, safety chain or safety cable across the opening when pipe is not being picked-up or laid down.
- Walkways with missing, broken or loose guardrails shall be taken out of service until repaired.

#### 4.8.6 Ladders

A ladder should always be used to reach objects or areas not readily accessible to the employee's reach.

- All ladders shall be inspected before use. Any damaged or unsafe ladders shall be tagged and taken out of service. Stationary ladders with missing, broken or loose steps shall be taken out of service until repaired.
- Both hands shall be kept free for climbing, descending and performing work on a ladder. No carrying of hand tools, grease guns, etc. while climbing on ladder. Articles, which are too large to be carried in a pocket or on a belt, shall be lifted and lowered by a hand line. Employee should not rush and should only take one step at a time.
- Only one person at a time shall be on the ladder.
- Portable ladders shall have anti-slip safety feet and be secured at the top before work begins in order to prevent the ladder from shifting. A second employee should hold

the ladder until the climber can secure it at the top. In addition, portable ladders should be set at the correct angle (1 foot out at bottom for every 4 foot of ladder height) to ensure stability.

- Only ladders that are not electrically conductive (wooden ladders or ladders with fiberglass rails) shall be used to perform electrical service work.
- Stationary ladders with a height greater than six (6) feet shall be caged or fall protection such as an inertia reel, static line with cable-grabbing device or double lanyard climbing method shall be used.

#### 4.8.7 Tank Roofs

Walking or standing on a tank roof is not permitted without fall protection. Working on a tank roof without fall protection in the form of guard rails or a full body harness system may be permitted with a Work Permit which includes proper job planning and a written HSE procedure.

#### 4.9 Respiratory Protection

Respiratory protection shall be worn when working in areas where respiratory hazards exist and are not controllable by other means. Some respiratory hazards which may be encountered include hydrogen sulfide (H<sub>2</sub>S), chlorine, galvanized pipe welding, sand blasting, or insulation work where Man Made Mineral Fibers (MMMF) and asbestos may be present.

The following requirements must be met by employees who will be using respiratory protection: (a) employee shall meet medical requirements for using this equipment; (b) employee shall receive training on the proper use, fit and maintenance of this equipment; (c) employee shall not have facial hair that will interfere with the seal of the face piece; (d) employee shall not wear eye glasses that interfere with the seal of the face piece; and (e) employee shall not wear contact lenses while using a respirator.

#### 4.10 Personal Flotation Devices (PFD's)

Personal flotation devices (PFD's), such as life jackets or work vests, shall be worn and properly secured at all times by personnel riding in a boat, making boat/platform transfers, and working in areas above water (such as barges, bottom walkways and decks of platforms, etc.) without guard rails. Personnel riding in a helicopter over water shall wear inflatable PFD's referred to as Mae West type life jackets. Belt pack type inflatable life jackets are not authorized for passengers on helicopter.

## 5.0 TRANSPORTATION

### 5.1 Vehicles

Employees driving a vehicle used for company business shall have a valid driver's license and use defensive-driving techniques at all times. Seat belts shall be worn by all vehicle occupants and all

posted signs obeyed when driving on site locations. Driving while under the influence of alcohol or other drugs is prohibited.

While on site locations, vehicles shall be parked in a safe area or area designated by site requirements. Also, when possible, vehicles should be parked so the driver can exit by driving forward. When leaving a vehicle, the driver shall put the vehicle in park, set the emergency brake, turn the engine off, and close the doors. If the engine must remain running while the vehicle is unoccupied, vehicle chock blocks shall be used to help prevent the vehicle from moving. Vehicles should be located outside the guy wire pattern of a drilling or workover rig. Guy wires shall be flagged and guarded against vehicle traffic. If it is necessary to bring a vehicle inside the guy wire pattern of the rig, a spotter shall be used to guide the vehicle and watch for hazards.

Personnel sleeping in vehicles on site locations - When personnel are sleeping in vehicles with the engine running, the occupant(s) shall first ensure:

- Vehicle is angled in a direction not in line with the wellhead.
- Vehicle is at least 100 feet from the well.
- Exhaust is not directed to any other occupied vehicle(s) and/or flowlines.
- At least one wheel is chocked.
- Emergency brake is set.
- At least one window is cracked open.

### 5.2 Boats

Employees shall follow the instructions of the boat captain on loading/unloading procedures, luggage storage, cargo, seating arrangements, and smoking restrictions. The captain has the authority to refuse passage to anyone he/she considers to be an unsafe passenger. All boat passengers shall walk (not run) on the boat's deck, keep one hand free for support, and wear a personal flotation device (PFD) when getting on or off the boat. All boats operating shall meet Coast Guard regulations.

### 5.3 Helicopters

Employees shall follow the instructions of the dispatcher, HLO/SES and pilot at all times. A helicopter pre-flight HSE orientation shall be conducted prior to flying offshore. The helicopter shall not be

approached until a signal is received from the pilot, HLO/SES or dispatcher. Always approach and disembark the helicopter from the side for the helicopter and from the forward left or right side for other types of helicopters. Never walk behind the aft cargo compartment and never walk under the helicopter tailboom.

Watch and crouch down when under the turning rotors and remain clear of the tail rotor at all times. Never use the emergency exit from the heliport unless it is a real emergency. All helicopter passengers shall walk (not run) to or from the helicopter. Wear your seat belt tight around your hips during flight, wear hearing protection and the Mae West inflatable life vest.

No hazardous material shall be carried on the helicopter unless the proper paperwork has been completed and the pilot has been notified of the material.

## 6.0 OFFSHORE (WATER) SAFETY

### 6.1 Swimming Requirements

All personnel going to water locations should be able to swim or to have successfully completed an industry-accepted training for swimming or water survival. Water survival training can be taken by swimmers or non-swimmers alike. The training equips an individual with the basic skills to survive in the water for a sufficient amount of time to allow rescue. All personnel will be required to sign a roster

attesting they are able to swim and that their employer has instructed them about the hazards and proper work practices specific to working offshore in the oil&gas industry.

### 6.2 Personnel Entry Into Water

Entry into the water shall be permitted only when:

- A diver is to perform specified work.
- An abandon platform order is given.

If rescuing a person in the water when there are no other reasonable alternatives, the person performing the rescue should first remove shoes and excess clothing, wear a personal flotation device (PFD), and attach a lifeline. Other persons should be in place secure the lifeline.

### 6.3 Boat-Platform Transfers

Personnel transferring between boats, platforms, and rigs shall wear a personal flotation device (PFD). Transfer by personnel basket and/or swing rope shall not be permitted without receiving proper training and an on-site orientation on the transfer. Personnel shall not board unlighted platforms or structures at night except when the accompanying boat is equipped to adequately illuminate the boarding operations.

### 6.4 Loading Equipment on Barges

All personnel shall use proper PPE, including personal flotation devices (PFD's), when loading equipment on a barge. The barge should be secured with a tugboat or double lines (if a tugboat is not available) and the ramp or barge level adjusted before attempting to load any equipment. During loading operations, ensure the load is centered on the barge for balance. All equipment on the barge should be properly secured with binders to prevent movement in case choppy waters are encountered during the move.

### 6.5 Fire and Abandonment Drills

Emergency drills shall be conducted on platforms once each month for each shift and on floating facilities once each week. Records of these drills shall be maintained at the facility.

Each manned platform shall have a station posted in conspicuous places and signed by the person in charge. The station bill shall be corrected immediately whenever there is any change in location of equipment or personnel.

## 7.0 ENVIRONMENTAL

### 7.1 ISO 14001

ISO 14001 is a continual improvement of environmental performance. The ISO 14001 standard is an internationally recognized standard for environmental management. Commitment to continual improvement of environmental performance is required by the ISO 14001 standard. All employees should be aware of the importance of conforming with this HSE Policy; the environmental benefits of improved personal performance; and the significant environmental issues or risks called “e-aspects” and their potential interaction with the environment as related to specific work activities. There are six (6) environmental impact including: (a) Emissions to Air; (b) Discharges to Water or Land; (c) Solid or Other Wastes; (d) Land/Sea Use or Contamination; (e) Material or Energy Use; and (f) Other Effects such as Noise, Vibration, Dust, etc. Each employee should read the ISO 14001 requirements.

### 7.2 Environmental Assessment

Prior to beginning any work activity, an environmental assessment should be completed to determine if adequate barriers are in place to prevent an environmental incident or permit violation.

The Environmental Assessment should evaluate whether:

- Activities generate any new discharges to the air, water, or land.
- Activities require any new permits.
- Activities affect any existing discharges.
- Existing discharges exceed the permit limits.
- Activities lessen the effectiveness of existing barriers to protect for an oil or chemical spill.

### 7.3 Spill (SPCC) Plans

Usually all locations have Spill Prevention, Containment, and Countermeasure (SPCC) response plans developed to comply with environmental regulations. It is your duty to report all environmental releases including oil spills, chemical spills, etc. as soon as possible to your supervisor or the representative.

### 7.4 Waste Management

All waste materials shall be disposed of properly. Employees are responsible for taking the necessary steps to prevent pollution and minimize the generation of waste.

Waste management shall include the following:

- Proper identification of each individual waste stream.
- Segregation of individual waste streams.
- Proper labeling, markings, manifesting, storage, and shipping of each waste stream.

Offshore Specific - For water locations, it is unlawful to dispose of any liquids, solids, or other material overboard. Failure to comply with this regulation can result in a substantial penalty.

### 7.5 Environmental Rules, Regulations, and Guidelines

All work activities shall comply with the rules, regulations, and guidelines specified in Environmental Compliance Manual (ECM) of the site. Questions concerning the

environmental policies should be directed to the local representative or local HSE Manager.

## 8.0 OCCUPATIONAL HEALTH

### 8.1 General

Occupational Health deals with identifying; evaluating (through monitoring, surveys, etc.); and controlling (through engineering, material substitutions, work practices, PPE, etc.) workplace health hazards.

Occupational Health objectives are to:

- Protect personnel health.
- Provide a framework for recognizing and managing health hazards.
- Comply with regulatory requirements.

### 8.2 Use of Prescription and Over-the-Counter (OTC) Medications

Employees must comply with local policy on medical conditions and the use of prescription and over-the-counter (OTC) medications.

### 8.3 Medical Response Plan

Usually, it is the policy to provide the employees and visitors with an organized and timely health care delivery system. The purpose of Medical Response Plan is to provide a guide for operations personnel in the management of initial on-site health care, medical evacuation, and continued care of the ill or injured employee.

### 8.4 Hazard Communication (HAZCOM) / MSDS Program

The purpose of the HAZCOM / MSDS program is to ensure that all known potential hazards of substances used or present at the work place are communicated to all employees.

Compliance with this program is achieved by:

- Labeling containers and providing information regarding hazards associated with unlabeled containers.
- Maintaining Material Safety Data Sheets (MSDS).
- Maintaining work place chemical inventory lists.
- Providing employees with information and training including measures employees should take to protect themselves from these hazards including proper work practices, PPE and emergency procedures.

Key hazards or conditions that may pose significant risk to health include the following:

### 8.5 Naturally Occurring Radioactive Material (NORM)

NORM is a low-level radiation source, which may be present in oil and gas formations. NORM is typically detected in scale build-up and can be found in tubulars, wellheads, flowlines, pits, vessels, and salt-water disposal well equipment. NORM is primarily an ingestion and/or inhalation hazard. Employees shall be trained in the hazards associated with NORM and procedures to avoid inhalation or ingestion.

### 8.6 Asbestos



Asbestos may be present in pipe/vessel insulation, brake pads, and in structural materials such as transit panels, floor tiles, and roofing felts. Asbestos is primarily an inhalation hazard. It is often difficult to differentiate between asbestos and non-asbestos without laboratory equipment. There may be older facilities where asbestos still remains.

Asbestos can present a hazard if not handled properly. To minimize the health risk it is important not to drill, cut, mine, remove, tear, step on, brush against, hammer on, or in any way disturb susp. Only trained personnel with proper equipment shall disturb or remove asbestos.

### 8.7 Man-Made Mineral Fibers (MMMMF)

Man-made mineral fibers (MMMMF) may be present in heat and acoustical insulation. MMMF's include fiberglass, mineral wool, and refractory ceramic fiber. MMMF's are primarily an inhalation hazard.

MMMMF's can present a hazard if not handled properly. Only trained personnel with proper equipment shall disturb or remove MMMF's.

### 8.8 Lead

Inorganic lead is typically found in paints and coatings. Lead is primarily an ingestion and/or inhalation hazard. Overexposure to lead can have serious short term or longer-term health effects.

Activities in which exposure to inorganic lead can occur include welding, cutting, sandblasting, and burning of painted and/or coated surfaces. Exposures above the Action Level (AL) of 30

micrograms of lead per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) averaged over an 8-hour workday triggers exposure monitoring, training, and medical surveillance requirements. The Permissible Exposure Limit (PEL) is 50 micrograms of lead per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) averaged over an 8-hour workday.

### 8.9 Heat and Cold Stress

For activities in which exposure to heat and/or cold stress can occur, the need to develop work/rest cycles, provide protective clothing and equipment, etc. shall be evaluated.

### 8.10 Food Control

Food/drink preparation and storage/consumption practices should prevent contamination from chemicals, oils, dirt, biological agents or any foreign matter. Facilities for washing before food preparation and consumption should be available near the workplace. Eating areas separate from work areas should be provided wherever practical.

## 9.0 PERMIT-TO-WORK (PTW) PROCESS

### 9.1 General

Permit-to-Work (PTW) process on routine and non-routine work activities is to ensure hazards and risks associated with these activities are identified and safeguarded. The PTW process is a comprehensive process for analyzing, planning, authorizing and

executing work in a manner to prevent HSE incidents and is much more than simply issuing permission to conduct certain jobs.

## 9.2 Work Permit

One of the key tools utilized in the PTW process is the Work Permit, which is a written document that authorizes identified personnel to conduct certain work activities within designated boundary conditions such as time, place, and the specific work steps required to ensure the job is completed in a manner to prevent HSE incidents. The Work Permit will generally be issued on a daily basis and re-issued at a shift/tour change or significant change in hazard

classification of job assignment. Consult the representative for those work activities that shall require a Work Permit, as well as those activities which may require a Work Permit depending on special situations such as simultaneous operations (SIMOPS).

The Work Permit document shall contain the following at a minimum:

- When the specified work will begin (date/time) and end and/or when a new permit will be required (date/time). A formal hand-over procedure must be in place for when Work Permits are issued for periods longer than one shift/tour and/or when Work Permit authorization changes.
- Who the permit is issued to (including company and individual's name).
- Where the specified work will take place.
- Full description of what work will be performed including proposed tasks and objectives and description of equipment to be used.
- Special considerations for safeguarding short service employees (SSE's).
- Description of all major hazards which could be encountered during the job, as well as, documentation of appropriate controls for each hazard identified.
- PPE necessary for specified work that will take place.
- Identify specific standards/procedures/guidelines that are applicable to work that will take place.
- Jobs involving Permit-required Confined Space Entry (PRCS), Lockout/Tagout (LOTO); Excavation and Trenching; or Hot Work will generally require additional documentation.
- Contingency plan if work does not proceed as planned.
- Actions to be taken in the event of an HSE incident including appropriate emergency response and notification phone numbers.
- Reference to all other activities that may be impacted by work which will be performed (including other Work Permits) to ensure alignment and coordination.
- Signatures of all workers who have reviewed the Work Permit and agree to meet all the operational and HSE requirements.
- Final documentation and formal hand-over procedure declaring the work has been completed and the job site left with no HSE issues or problems and ready to return to service.
- Need to provide for the suitable display of Work Permits.

## 9.3 JSA/JHA

Another key tool to the process, besides the Work Permit, is the Job Safety/Hazard Analysis (JSA/JHA). The JSA/JHA also helps ensure appropriate precautions and procedures are employed to eliminate or minimize identified HSE hazards and risks for activities conducted. The JSA/JHA is a process for discussing and documenting each step of a job, identifying the existing or potential HSE hazards and then determining the best way to perform the job to reduce or eliminate the hazards. JSA/JHA are effective tools to be used for jobs that will take place even when a Work Permit is not required.

## 10.0 MANAGEMENT OF CHANGE (MOC) PROCESS

Usually a Management of Change (MOC) process is to be used for all operations in which major changes are planned, both permanent and temporary, that can have a significant impact on the HSE aspects of a job or operation. The purpose of the MOC process is to ensure hazards and risks associated with these changes are identified and managed.

Examples of “changes” may include:

- Physical changes to equipment.
- Equipment and/or structural additions to a physical asset.
- Changes to software.
- Personnel changes (staff and management).
- Changes in project scope.
- Procedural changes.

The MOC Process provides for appropriate review, approval, implementation, and tracking. An appropriate employee should review changes to local equipment, procedures, etc., to ensure proper use of the MOC process and also determine if any adverse affects to HSE could result from the change. Consult the representative for those changes that will require use of the MOC process.

## 11.0 PROCESS SAFETY MANAGEMENT (PSM)

Representatives are responsible to see that their employees are trained to perform their jobs safely, and have been instructed in the process hazards and emergency action plans for the facility. The Operator or Contractor shall maintain documentation of employee training. Documentation shall include employee identification, training dates, and description of the training and the means used to verify the employees understanding.

The Operator or Contractor shall ensure that the employees follow all safety requirements, and the safe work practices listed in written operation procedures. It is appreciated to add employees inputs to improve or enhance the facility safety.

## 12.0 GENERAL OPERATIONS

### 12.1 HSE in the Office

HSE in the office is as important as HSE in the field. Each office shall have an emergency evacuation plan and shall conduct an evacuation drill annually. Employees shall be familiar with emergency evacuation procedures, evacuation routes, and specific responsibilities. Office doors shall be closed, but left unlocked during an emergency evacuation. Elevators shall not be used. Use handrails when ascending/descending stairs. Hallways, entrances, and exits shall be kept free of obstructions. Material shall be stored in an orderly fashion and work areas kept clean and free of tripping hazards such as cords, drawers, books, files, etc.

### 12.2 Lifting of Loads by Personnel

Back injuries may result from improper lifting techniques. Lifting a load that is too heavy, or lifting in the wrong position, can cause an injury.

Follow these guidelines to lift safely:

- Make sure the area is clear of tripping hazards.
- Face the load you’re about to lift.

- Bend your knees.
- Keep the load close to your body.
- Keep your back straight.
- Use your legs, not your back, to lift the load.
- Do not twist your body while carrying a heavy load.
- Do not try lifting a load that is too heavy - ask for help.
- When lifting a load with another person(s), communicate with the other person(s) before lowering your end of the load.

### 12.3 Lockout / Tagout

Lockout/Tagout is a procedure to isolate personnel from all potential energy sources when performing maintenance or service on equipment; especially when that maintenance or service requires the disabling or removal of normal guards and safety devices. Potential energy sources include electrical, mechanical, pneumatic, hydraulic, thermal, chemical and all forms of potential stored energy. Local Contractor shall have written Lockout/Tagout program in effect.

Lockout/Tagout Procedure:

- Employees shall share information prior to the start of the work requiring Lockout/Tagout to make each other fully aware of the other's Lockout/Tagout procedures.
- Repairs, service or alterations shall not be made on equipment in operation. All equipment shall be shut down and a Lockout/Tagout device used in such a manner that the

equipment cannot be accidentally started while being worked on. The power switch of the equipment to be worked on shall be Locked out/Tagged out.

- To ensure the equipment has been properly locked out of service prior to starting any work, a qualified person shall attempt to turn on the power source to ensure the equipment does not become energized.
- Drilling/Workover Rig Specific - Before equipment is unplugged or plugged into a power distribution panel, the power source shall be Locked out/Tagged out. This includes all equipment that is unplugged or plugged into the SCR distribution panel during rig moves.
- Examples of equipment repairs or maintenance that require Lockout/Tagout procedures include, but are not limited to, those listed below. Consult your supervisor or the representative for site specific work requiring Lockout/Tagout procedures.
  - Changing filters.
  - Pump repairs or changing swabs/liners.
  - Repairs to paddles in tanks or cleaning of tanks with paddles.
  - Maintenance on the rig draw works such as adjusting the brakes, greasing, inspections, etc.
  - Generator repairs.
  - Compressor repairs.

### 12.4 Confined Space Entry

Confined space entry is defined as entry of personnel into a confined space such as a tank, vessel, rig cellar, earth pit, etc. A confined space is defined as space that: (a) has an open top and is more than four (4) feet in depth; (b) has openings large enough and configured so that a person can physically enter the space and perform work; (c) has limited or restricted means of entry or exit; and (d) is not designed for continuous human occupancy.

Confined Space Entry Requiring a Work Permit – Entry in a confined space can expose personnel to one or more of the following hazards, in which case a Work Permit shall be required for personnel to enter space:

- Hazardous atmosphere such as toxic or flammable vapors.
- Oxygen-deficient atmosphere.
  
- Material, such as mud or sludge, that has the potential for engulfing an entrant.
- An internal configuration such that the entrant could be trapped or asphyxiated.
- Inwardly converging walls or floors, which slope downward and tapers to a small cross section.
- Other recognized serious health or safety hazards.

Under no circumstances shall an employee be allowed to enter a confined space without a properly completed Work Permit approved by the Contractor and Operator supervisor. The Work Permit shall have a Sign-In/Sign-Out sheet for entrants and the hazards shall be discussed with the entrant prior to that person entering the space.

All confined spaces that can be readily accessed and have the potential to contain hazards shall be barricaded or labeled “DANGER DO NOT ENTER – ENTRY PROCEDURES REQUIRED”.

Minimum requirements for entering confined spaces:

- The air in a confined space shall be tested prior to a person entering the space for oxygen (O<sub>2</sub>) content; Lower Explosive Limit (LEL); and hydrogen sulfide (H<sub>2</sub>S) in that order with an approved and calibrated device by a person trained and certified to use the device.

DANGER levels are as follows:

- Oxygen (O<sub>2</sub>) content below 19.5% or above 23.5%.
- Lower Explosive Limit (LEL) 10% of LEL.
- Hydrogen sulfide (H<sub>2</sub>S) – 10 parts per million (ppm).
  
- If the air in a confined space is contaminated, the space shall be purged until an acceptable working atmosphere is achieved prior to a person entering the space.
- When a person is in a confined space, ventilation into the space shall be provided at a rate of 3 air volume changes per hour. Mechanical ventilation via blowers, etc. shall be required if natural ventilation is not sufficient. Drilling/Workover Rig Specific Mechanical ventilation via bug blowers, etc. shall be required for mud tanks prior to entering and during the cleaning operation.
- One or more trained persons must act as an attendant whenever work is performed within a confined space. There shall be an effective means of communication established and maintained between personnel in the confined space and the attendant(s). Communication shall be visual, voice or a signal line.
- Any rotating, agitating or other equipment that can present a hazard to the entrant within the confined space shall be Locked out/Tagged out at the equipment’s power source and at the power switch prior to the person entering the space.
- A lifeline shall be attached to the person entering a confined space. Care shall be used to ensure entanglement of lifeline will not occur.
- In completely enclosed spaces, such as frac tanks, a continuous atmospheric monitor shall be worn by the person entering the space.
- Drilling/Workover Rig Specific Although not considered a confined space, vapor build-up and ambient temperatures in the mud tank area may require that blowers be installed in a position to adequately ventilate the area.

## 12.5 Hot Work

Hot work is defined as welding, flame cutting, burning, grinding or using a torch. When possible, hot work should be performed in a shop, outside the facility, or in a "Safe Welding Area". A "Safe Welding Area" (SWA) shall be established on all platforms and rigs where substantial welding or flame cutting is anticipated. All welding and flame cutting operations shall be done in the established "Safe Welding Area" unless otherwise authorized. SWA's are typically located 100 feet from wellbores, 50 feet from heavily vegetated areas, 35 feet from combustibles (stored oil, diesel, etc.) and on a non-combustible surface.

If hot work needs to be performed outside of the SWA, especially on an offshore platform, it may be necessary for personnel to shut-in or curtail producing wells, certain process vessels or other operations. In addition, all movable fire hazards in the vicinity shall be removed to a safe distance or guards used to confine the heat, sparks and slag and to protect the immovable fire hazards. A Work Permit shall be issued for all hot work done outside of the SWA (i.e. welding in the rig cellar) and approved by the Contractor and Operator supervisor. Hazards and recommended special precautions should be documented in the Work Permit. Offshore Specific approval of the Work Permit must be obtained from both the platform and rig supervisors.

The hot work equipment and work area shall be inspected prior to beginning any hot work operations to ensure safe working conditions. This includes checking for explosive atmospheric conditions in all vessels, piping and confined spaces and documenting the results on the Work Permit. Oxygen and acetylene cylinders shall be stored valve end up and properly secured.

### 12.5.1 Hot Tapping

Hot tapping involves tapping into a line or vessel, which has the potential to contain hydrocarbons or other flammable material. Hot tapping requires a Work Permit and the approval of the Contractor and Operator supervisors.

### 12.5.2 Fire Protection During Hot Work Operations

The following precautions shall be taken during Hot Work operations for fire protection:

- Firewatchers with suitable fire extinguishing equipment shall be required whenever hot work operations are performed outside of the SWA. The fire watch shall be maintained for a minimum of a half-hour after completion of hot work operations so the danger of fire has passed.
- Oxygen and acetylene cylinders shall be kept at a safe distance from the actual hot work operation so the sparks, hot slugs or flames do not reach the cylinder. If such safe distance cannot be maintained, fire resistant shields shall be used.
- A jet of oxygen shall not be permitted to strike an oily surface, greasy cloths or enter a fuel oil or other hydrocarbon storage tank.
- A jet of oxygen shall not be used to blow dirt out of boltholes, sockets, nuts, etc. If objects such as these need to be cleaned, compressed air shall be used.
- Welding cables with splices within 10 feet of the clamps shall not be used. The welder shall not coil or loop welding electrode cables around parts of the body.
- Wherever there are floor openings or cracks that cannot be closed, precautions shall be taken so that no readily combustible materials below will be exposed to sparks.
- During hot work operations outside the SWA, combustible floors shall be kept wet, covered with damp sand, or protected by fire resistant shields.
- Hot Work operations shall not be permitted in the following situations:

- In areas not authorized by the Operator supervisor.
  - In the presence of explosive atmosphere or where such atmospheres may develop.
  - Where ignition can be caused by heat conduction, such on metal walls or pipes in contact with combustibles on the other side.
  - When wind conditions are such that sparks could be carried to combustible materials.
- Prior to welding or cutting, all hollow spaces or containers shall be vented to permit the escape of air or gases. Purging with inert gas is recommended.
  - No cutting will be allowed on used drums or tanks.

### 12.5.3 Ventilation During Hot Work Operations

Adequate ventilation shall be provided when hot work is done:

- In a space of less than 10,000 cubic feet per welder.
- In a space having a ceiling height of less than sixteen (16) feet.
- In a confined space or where the hot work space contains partitions, balconies or other structural barriers to the extent that they significantly obstruct cross ventilation.
- Where the nature of the hot work is such that the release of toxic fumes or gases is possible including hot work on stainless steel, zinc, lead, degreasing or cleaning compounds containing hydrocarbons.

## 12.6 Electrical Safety

Each site shall address and minimize personnel exposure to electrical hazards through effective equipment operation, design, specification, installation, and maintenance.

### 12.6.1 Electrical Safe Work Practices

All electrical work shall be done in accordance with the latest codes, standards, and regulations including, but not limited to: National Electric Code (NEC), National Electrical Safety Code (NESC) and any federal, state, or local standards. Hazardous electrical work shall only be done by qualified electricians using proper PPE. All electrical work will be reviewed with the Operator supervisor to determine if a Work Permit is required.

A qualified person shall discharge all stored electrical and shall verify the equipment is de-energized and proper Lockout/Tagout procedures implemented prior to beginning electrical work.

### 12.6.2 Power Lines

All power lines shall be considered energized unless proper measures have been taken to de-energize. The Operator supervisor shall be advised when loads over twelve (12) feet high will be traveling on local roads – in some cases a Work Permit may be required.

When work is performed near energized overhead power lines, equipment such as boom, mast, crane, or its load shall never be permitted within ten (10) feet of power lines. See Section 15.0 entitled “Minimum Equipment Spacing Requirements” for minimum distance based on KV rating.

Derrick, guy wire and geronimo lines shall clear all energized power lines by 25 feet during rig up, rig down, or while operating.

## 12.7 Static Electricity

Static electricity is generated any time liquid or solid substances are flowed, sprayed, agitated, rubbed or splashed. Static electricity can cause a spark hazard unless special precautions are taken.

The following are requirements to minimize the possibility of creating a spark and the hazard of a fire or explosion in the presence of hydrocarbons or other flammable/combustible liquids:

- Containers - Only metal buckets (handles should also be metal) shall be used for collecting hydrocarbons or other flammable/combustible liquids. The metal bucket must have direct metal contact using a bonding cable to the nozzle or fill pipe from which the liquid is discharged. The nozzle and fill pipe shall also be metal. The liquid shall be discharged slowly into the bucket to maintain a low velocity and minimize amount of static electricity generated.
- Tanks - Metal storage tanks shall be grounded. All personnel shall ground their bodies by taking hold of a grounded metal surface, such as a steel walkway, etc. before opening a gauge hatch on a tank.
- Tank/Vacuum Trucks - During the loading and unloading of hydrocarbons or other flammable/combustible liquids, tank/vacuum trucks shall be grounded using a bonding cable to the storage tank before the transfer line is connected. The transfer line shall be disconnected before the bonding cable is disconnected.

## 12.8 Operating Equipment

Operating equipment typically refers to rotating or reciprocating equipment such as compressors, pumps, pumping units, etc.

The following are requirements to minimize the possibility of an HSE incident during the repair, service, startup, etc. of the operating equipment:

- Only trained operators shall start and stop operating equipment.
- Jewelry such as rings, watches, wrist chains, or key chains or loose clothing shall not be worn when working around operating equipment. Long hair shall be confined.
- Repairs, service or alterations shall not be made on equipment in operation. All equipment shall be shut down and a Lockout/Tagout device used in such a manner that the equipment cannot be accidentally started while being worked on.
- Guards and other safety devices shall be reinstalled before equipment is operated.

## 12.9 Crane, Gin Pole and Rigging Safety

Only trained and qualified personnel shall operate cranes and gin pole trucks. All work utilizing cranes shall be done in accordance with local regulations. Only approved personnel shall be allowed to operate on cranes. All cranes and gin pole trucks shall be strictly maintained in accordance with the manufacturer's recommendations.

Offshore Specific Offshore crane operations shall comply with API RP2D. Only those personnel who are certified through crane operator training shall be authorized to operate the cranes on offshore platforms. Only personnel (including all contractor riggers) that have received rigger training and certification that is recognized by the MMS may perform rigging operations for cranes operating for the Operator.



The following are requirements to minimize the possibility of an HSE incident during crane, gin pole, and rigging operations:

- All personnel shall be clear of a load before it is picked up and shall remain clear at all times. Personnel should face the crane or gin pole truck in full view of the crane operator and/or signal man. Personnel, including those holding the tag line, shall never be under suspended loads or go between the load and other objects where they may be trapped or crushed.
- The crane operator shall never leave the controls while a load is suspended.
- Riders shall not be permitted on the exterior of gin pole trucks
- Non-conducting tag lines shall be used to control all suspended loads. Chains or steel cables are not acceptable. Tag lines shall be attached before a load is lifted.
- A signalman shall be used if the crane operator does not have full view of lifting operation. Where practical, the use of radios or other communication equipment is also recommended. The crane and gin pole operator shall respond only to signals from the signalman, but shall obey a stop signal from anyone at any time.
- The crane and gin pole operator shall inspect lift lines, rigging, slings and crane and gin pole fittings/fasteners daily when in use or prior to each lift and replace if necessary. This equipment shall be properly rated for the intended load and certification tags attached to all slings. Wire rope shall not be secured with knots.
- The operator shall inspect all cranes and gin pole trucks prior to use. Cranes should be load marked. In addition, cranes shall have the most recent inspection records posted in the cab.
- A crane shall not be used to pull a load sideways.
- A crane boom shall not be used as a ladder for walking, except for necessary maintenance of the boom and its components.
- When not in use, the crane boom or gin pole mast shall be kept in the cradle.
- Offshore Specific - Crane operations during helicopter approaches or departures are strictly prohibited. Prior to helicopter approaches or departures, the crane operator shall:
  - Land the attached load.
  - Position or secure boom to avoid interference with helicopter.
  - Disengage the clutch.
  - Set all locking devices.
  - Put controls in “off” or “neutral” position.
  - Stop the engine.
  - While wearing high visibility green vest, step out of the cab or away from the controls to indicate to the pilot that the helicopter has been seen.
- For rigging, never use a chain when it is possible to use a wire rope.
- Determine the load weight before rigging it and do not exceed the safe working load of any equipment.
- Before being unhooked, all loads shall be safely landed and properly blocked.
- Wire rope slings and chain shall never be shortened by tying knots in them or by wrapping them around the crane hook. Protruding ends of strands in splices on slings shall be covered or blunted.
- Slings shall be protected from sharp edges by blocking or protective pads.
- When multi-leg slings are used, each leg of the sling should be loaded evenly.
- Kinked wire rope slings shall be removed from service. Wire rope shall be kept lubricated and free of corrosion.

### 12.9.1 Procedure for Using Tag Lines

- If tag lines are impractical during final positioning of the load, caution should be taken to ensure that no part of the person's body guiding the load be between the load and other objects where they may be trapped or crushed.
- No attempt to guide a load shall be made with the tag line wrapped around a hand or waist.
- The tag line must be free of knots.
- A tag line shall be of sufficient length so that no part of the person guiding the load shall be under the load at any time.
- When lifting a load with a gin pole truck, a snub line from the load to the truck may be used in lieu of a hand-held tag line. However, a swamper (flagman) must be used. Swampers will be required to stand back a minimum of ten (10) feet from a load that is being lifted or tail boarded on a truck or trailer.

### 12.9.2 Use of a Crane to Hoist Personnel

Offshore Specific - The use of a crane to hoist employees on a personnel platform to the worksite is prohibited except when the erection, use, and dismantling of the conventional means is more hazardous. Cranes used to lift personnel should be equipped with an "anti-two-blocking" device. In addition, the MMS requires a ¼" tag line to be used with personnel baskets. The personnel lift procedure shall be reviewed and approved by the Operator supervisor prior to any lifts.

### 12.10 Excavation and Trenching

An excavation is any man-made pit, trench, hole or cut into the ground formed by the removal of earth. Potential hazards include,

but are not limited to cave-ins, hazardous atmospheric conditions, and rupture or contact with a live flowline or utility installation.

The following are requirements to minimize the possibility of an HSE incident during excavation and trenching operations:

- All excavation and trenching operations shall be performed under the supervision of a "competent" person as specified in local regulations and all requirements met.
- Personnel entering a trench or excavation exceeding four (4) feet in depth must follow confined space entry procedures and require a Work Permit approved by the Contractor and Operator supervisor. A safe means for personnel to enter and exit shall be provided.
- Locations of flowlines and utility installations shall be established prior to beginning excavation or trenching operations.
- Adequate protection from cave-ins shall be provided through appropriate sloping, shoring or shielding as determined by the "competent" person supervising the operation.
- All unattended excavations and trenches shall have barricades that are visible after dark.

### 12.11 Scaffolding Safety

Scaffolding shall be used when appropriate. Climbing or working from the handrail, mid-rail, or brace members of the scaffolding is prohibited.

### 12.12 Sandblasting and Painting

### 12.12.1 Sandblasting

The potential hazards during sandblasting operations include, but are not limited to inhalation of dusts (including lead from the paint or silica from the blasting medium); high noise levels; high operating pressure of equipment; etc.

The following are requirements to minimize the possibility of an HSE incident during sandblasting operations:

- Contractors performing sandblasting operations shall have a medical surveillance program in place to monitor employee's blood level exposure to lead.
- Approved respiratory and hearing protection shall be worn.
- Appropriate eye protection shall be worn.
- The use of silica sand in the blasting medium is discouraged.
- Paint coatings being removed by sandblasting operations shall be considered as lead containing until proven otherwise.
- Check all hoses every day for leaks and signs of wear.
- Ventilation (either mechanical or natural) shall be adequate to keep the work atmosphere less than 10% Lower Explosive Limit (LEL) and the oxygen (O<sub>2</sub>) content greater than 19.5%.
- Bleed or depressure all lines before disconnecting.
- Blasting nozzles shall be equipped with a cut-off device (dead man's switch).
- Secure and hobble all high-pressure air hose connections.
- All air hose connectors (Crow's Feet) shall be pinned or wired to keep them from coming apart.
- Warning signs shall be posted identifying potential hazards.

### 12.12.2 Painting

The potential hazards during painting operations include, but are not limited to inhalation of toxic vapors or spray mist; fire hazard due to solvents in the paint, etc.

The following are requirements to minimize the possibility of an HSE incident during painting operations:

- Contractors performing painting operations shall have a medical surveillance program in place to monitor employee's blood level exposure to lead.
- Approved respiratory protection shall be worn.
- Appropriate eye protection shall be worn.
- Be aware of and eliminate ignition sources in the work area.
- Ventilation (either mechanical or natural) shall be adequate to keep the work atmosphere less than 10% Lower Explosive Limit (LEL) and the oxygen (O<sub>2</sub>) content greater than 19.5%.
- Bleed or depressure all lines before disconnecting.
- Warning signs shall be posted identifying potential hazards.

### 12.13 Compressed Air Used for Cleaning

Compressed air used for drying or cleaning shall be limited usually to 30 psi (gage) by a pressure regulator or pressure-reducing nozzle.

Directing compressed air toward a person for any reason is prohibited. When using compressed air for cleaning in a dry and dusty situation, protective eye goggles, gloves, and a dust filter for respiratory protection shall be worn at a minimum.

### 12.14 Use Of Cheater Bars/Pipes

- Use of cheater bars/pipes shall only be used as a last resort to break a connection after the largest wrench available has been tried.
- Cheater bars/pipes shall not be used to open a closed chain- binder (boomer). Pry bars shall be used in this application. When using a cheater bar/pipe to close a boomer, avoid standing in the path of the binder release in case of kickback.
- It is recommended that the cheater bar/pipe length not exceeds twice the length of the wrench or binder handles. According to wrench manufacturers, use of cheater bars/pipes longer than twice the length of the wrench creates a potential for failure of the wrench. This type of failure usually occurs in the heel of the bend in the wrench head. If the cheater bar/pipe that is twice the length of the wrench doesn't work, it is recommended to move to a larger wrench, which would allow a longer cheater bar/pipe. In tight work areas, where an extension via means of the cheater bar/pipe would optimize the footing of the person turning the wrench, a cheater bar/pipe longer than twice the length of the wrench may be used.
- When using a cheater bar/pipe to pull on a wrench handle, always assume the proper stance to prevent falling.
- It is highly recommended that cheater bars/pipes made of brittle materials such as fiberglass is prohibited.

### 12.15 Forklift Safety

Only trained and qualified personnel shall operate forklifts. Training shall be conducted. All forklifts shall be strictly maintained in accordance with the manufacturer's recommendations.

- Unauthorized personnel shall not ride on forklifts. Each forklift will be required to have a "NO RIDERS" sign in a visible area of the forklift.
- The forklift shall have an alarm signaling when vehicle is backing up.
- When a forklift is left unattended, the forks shall be fully lowered, controls put in "off" or "neutral" position, the power shut-off, and the brakes set. Wheels shall be chocked if the forklift is parked on an incline.
- The forklift operator shall ensure that the forklift's wheels are properly chocked before unloading.
- Seat belts shall be worn when operating a forklift equipped with a rollover protection device.

### 12.16 Use of Hand and Power Tools

Tools shall be maintained in good condition and defective tools repaired by qualified personnel or replaced. Where potentially explosive atmospheres exist, explosion-proof and non-sparking tools and extension cords shall be used.

Hand tools shall always be used for their intended purpose. For example, wrenches shall not be used as a hammer; screwdrivers shall not be used as a chisel or pry bar; pipe wrenches shall not be used on hex nuts; grinder wheels shall be properly rated for the speed of the grinder; etc. Guards shall be in place and not modified. Power tools and extension cords shall have proper grounding.

## 13.0 DRILLING AND WELL SERVICING OPERATIONS

### 13.1 General

- Drills - Drills shall be conducted regularly to ensure personnel are familiar with emergency action plans. Pit and trip drills shall be held weekly. Records of drills shall be maintained at the rig site.
- BOP Tests - BOP's shall be tested when initially installed and every two (2) weeks thereafter. Some workover operations may require the BOP's to be tested every week. Records of tests shall be maintained at the rig site. Prudence shall be given regarding testing criteria on wells incapable of sustained flow.
- Grating over cellar - A grating shall be put over the cellar in order to prevent personnel from falling into the cellar. The grating should either be plastic or expanded metal. Wooden boards are unacceptable.
- Electrical storms - All operations on or near drilling and workover rigs, metal tanks and equipment, and those involving explosives (including wireline perforating, etc.) shall be suspended until thirty (30) minutes after an electrical storm has passed.
- Flare igniters - Remote flare line igniters shall be provided for all 5,000 psi and above gas well drilling locations, all H2S locations, and any other locations where the venting of gas is likely to be a necessity. Remote flare igniters are not required when the well can be readily shut-in such as during coiled tubing, snubbing, and flowback operations.
- Geronimo lines - Derrick escape lines (geronimo lines) shall be installed as specified by the IADC.
- Rig Elevators - Rig elevators provided to access the rig floor are prohibited.
- Pipe Fill Up - Only low-pressure centrifugal pumps shall be used for casing, drill pipe or workstring fill up. Use of high-pressure pumps is prohibited unless a system valve can safely be left open to prevent excessive pressure to the fill-up hose.
- Use of Pickup/Laydown Machine - Personnel shall not be on the catwalk or under the Vee-door area while the laydown/pickup machine trough is in operation. If work needs to be performed in this area, the laydown/pickup machine shall be shut down completely and the trough secured.
- Drip Pans - Drip pans shall be used under equipment, motors, etc. to contain any leaking hydraulic fluid, oil, transmission fluid, etc.

### 13.2 Underground Lines

Each location shall be checked for all underground lines (power lines, gas flowlines, and injection lines) and the lines distinctly marked where they cross the location. Excavation, trenching, and/or other ground penetrating operations such as installing anchors or stakes shall not be done in the vicinity of underground lines.

### 13.3 Rig Equipment Grounding

All grounding shall comply with the National Electric Code (NEC) Article 250, unless preempted by other government regulations.

- Each generator frame/skid shall be grounded to the earth with two earth bonds. The frame of a portable generator shall not be required to be grounded per NEC provided that the generator supplies only equipment mounted on the generator or equipment connected via cord/plug through receptacles mounted on the generator. In addition, noncurrent-carrying metal parts of the equipment and the equipment grounding

conductor terminals of the receptacles shall be bonded to the generator frame.

- All electrical-equipped buildings or skids, including living quarters and lab trailers, shall be grounded to the earth or bonded to equipment that is grounded.
- Ground fault detection systems with visual alarm devices shall be installed on all SCR AC and DC systems.
- All electric equipment (including motor switches) shall be externally bonded to a skid that is grounded or bonded.

- During wireline operations, ground lines shall be installed and connected to the rig and wellhead.

### 13.4 Mismatched Hammer Unions

Serious injury has occurred in the oil industry from the make-up of hammer unions that, although visually appear to be the same pressure rating, actually are not the same rating, resulting in an improper connection. This improper connection will even appear to make up properly, but have the potential to fail well below the pressure rating of the weaker component. Failure of the connection can create serious HSE hazards including metal projectiles and the release of high pressure, and possibly toxic, fluids.

The problem normally occurs because the threads of a two (2) inch Figure 602 (6,000 psi rating) and Figure 1002 (10,000 psi rating) hammer union will make up with a two (2) inch Figure 1502 (15,000 psi rating) hammer union. Never make up hammer unions unless they are clearly marked as to their type to ensure the make up is compatible. If in doubt, a "Roughneck Saver" (go/no-go gauge) shall be used to determine the hammer union type and the hammer unions then clearly marked before make up.

### 13.5 Tubular Handling

#### 13.5.1 Tubular Loading and Unloading

No personnel shall be within twenty (20) feet of the truck or forklift while tubulars are being loaded or unloaded unless the tubulars are less than ten (10) feet in length and require a person to be on the float to load/unload. If it is necessary to use a forklift to assist in installing or removing chocks on the float, the forklift shall be in position and stationary before any personnel approach.

Appropriate material-handling equipment shall be required for unloading and loading tubulars on trucks. A forklift shall be required for handling more than a single-piece tubular. The forklift shall be capable of reaching across the float of a truck. The loading and unloading of tubulars with a gin pole truck is prohibited.

Other tubular loading requirements include:

- When the tubular load exceeds one layer, "dock racks" (bolsters) shall be used on the float and each layer of tubulars be stripped and chocked.
- Stripping for tubulars larger than five (5) inches shall be 4" x 4" wood and for tubulars five (5) inches or smaller shall be 2" x 4" wood.
- Chocks shall be made of plastic and properly installed, i.e. if the chock requires two (2) nails then (2) nails shall be installed.
- Pyramid loading of tubulars is prohibited.
- The top layer of the load must be strapped with a minimum of one (1) strap per ten (10) feet length.
- A minimum of two (2) straps shall be used on any tubular piece.
- The load height shall not exceed the height of the headache rack on the truck.
- Side stakes may be used only if tubular load is one layer.
- All personnel shall stay outside the ends of the tubulars during unloading and loading in the event the tubular rolls unexpectedly.
- All of the above requirements include tubulars being moved or sold as "junk".
- Improperly loaded trucks shall not be allowed on location to be unloaded or allowed to leave the location.

#### 13.5.2 Pipe Racks

- Walking on pipe racks is prohibited.
- Tubulars shall be chocked immediately after being placed on the pipe rack.
- When rolling tubulars, including casing and drill pipe, the following procedures shall be observed:
  - Push tubular away from the body when possible.
  - Place hands on the backside of tubular in a safe position.
  - Watch for pinch points when rolling tubulars.
  - Rolling tubulars with feet is prohibited.
  - All personnel shall stay outside the ends of the tubulars in the event the tubular rolls unexpectedly.
  - For casing and drill pipe, one person shall be at each end of the tubular.
- Minimum stripping on pipe racks shall be 2" x 4" wood and stripping for tubulars 9-5/8" and larger shall be 2" x 6" wood.
- The end of the stripping wood shall not protrude out more than a few inches beyond the racked tubulars.

### 13.5.3 Rig Floor Tools for Running Tubulars

#### Slips

- Shall be properly maintained (lubricated as needed).
  - Shall be handled by a minimum of two people to lift.
  - Shall never be kicked into place.
  - Broken or worn slips shall be replaced.
  - Dies shall be checked regularly, kept clean/sharp, and replaced as necessary.
- Broken dies shall be replaced and correct keepers used. A full-face shield shall be worn when replacing dies.
- Original equipment replacement handles shall be used.

#### Tongs

- Tong counterbalance weights shall be properly maintained (weight balance and well lubricated) for vertical movement of the tongs.
- Tong counterbalance weight baskets shall be equipped with a means of completely securing any weight objects placed in the basket.
- The tongs shall be snubbed to an anchor post or a derrick leg.
- Safety switches shall be installed on power tongs to ensure that they are not operated unless the tong doors are closed. In addition, the doors that close the front of the

tongs shall have a positive latching mechanism to keep the door shut.

- Personnel shall position themselves clear of the arc of the tongs while making up or breaking out tubulars.
  - Latches shall always be clean and lubricated.
  - Dies shall be checked regularly, kept clean/sharp, and replaced as necessary.
- Broken dies shall be replaced and correct keepers used. A full-face shield shall be worn when replacing dies.
- A piece of chain or other material shall never be used to make the tongs "bite".
- Always use proper size jaws for the pipe being used.
- Tongs shall never be latched around tubulars that are moving.
  - Tongs shall be hung in the mast so that they swing away from drill pipe when unlatched.
  - When not in use, tongs shall be hooked back in the derrick corner.

#### Other

- Proper sized drill collar clamps shall be used.
- A safe means of lowering thread protectors from the rig floor to the ground shall be enforced. Lowering unsecured thread protectors in the pickup/laydown machine trough is unacceptable. A chain can be threaded through the protectors to secure them in the trough.

#### 13.5.4 Casing Crews

- Equipment, such as pick-up lines, cable hooks, elevators, etc. shall never be modified without consulting the manufacturer.
- The stabber shall not stand on a rig girt to stab casing an adjustable stabbing board located on the side of the derrick opposite the driller shall be used. A permanent or semi-permanent adjustable stabbing board should be mounted on the rig whenever possible (not always possible on small derricks).
- The driller shall pay close attention while lifting joints of casing out of the pickup/laydown machine trough in anticipation of potentially short joints, which swing out of the trough quicker than long joints.
- Personnel shall never place hands on the floor pole of the pickup/laydown machine.
- A drill collar clamp shall be used for securing the floor pole of the pickup/laydown machine pole in the mouse hole and a guard must be provided to cover the clamp and mouse hole.

#### 13.6 Above-Ground Pressurized Lines

Properly anchor and hobble pressure relief lines and above-ground pressurized lines that might move during operations. Return and blow-down lines shall be directed to a safe place from the wellhead with the working area down wind. Secure the rotary hose and all other flexible/pressurized hoses with a safety chain. Choke manifold vent and flare lines shall be secured by earth guyline anchors, concrete anchors, or other industry-accepted anchoring system.

#### 13.7 Cementing

- Cement lines shall be laid flat on the ground and anchored.
- Chicksans shall be supported by the air hoist line when tubulars are being reciprocated during cementing operations.
- The portion of the cement line from the ground to the rig floor shall be chained or supported on the floor. A permanent cementing line from the ground to the rig floor should be mounted on the rig whenever possible.
- Cement lines shall be tied off to the bails at the cement head.
- Samples should be taken from a sampling line and never from the blenders with the agitator in operation.
- Stepping between trucks or climbing over pumps and blender tanks is prohibited.

#### 13.8 Perforating and Other Wireline Operations Involving Explosives

- Signs shall be posted at the location entrance, at least 500 feet from the operation, notifying that explosives are in use.
- Nighttime perforating operations is not recommended due to lighting constraints, prudence should determine all after dark decisions.
- Explosives shall be handled only by qualified personnel designated by the Contractor performing the operation. All non-essential personnel not involved in handling the explosives are to remain outside of the immediate work area.



- All two-way radios, telephones, welding machines and other electrical power sources located within 500 feet of the wireline operation involving explosives shall be turned off.
- Electric line truck shall be grounded to the wellhead before operations begin.
- Hazards from static electricity that can develop from blowing dust or snow should be evaluated and proper precautions taken.
- The wireline shall be isolated from the firing panel until the explosives reach a minimum depth of 200 feet. The explosives shall be locked out and shorted out above 200 feet when removing “live” explosives from the wellbore.

## 14.0 SEISMIC OPERATIONS

Additional HSE information on seismic operations may be obtained from the Land Geophysical Operations Manual on site.

### 14.1 Electrical Storms

All operations involving explosives shall be suspended until thirty (30) minutes after an electrical storm has passed. This includes making up charges, loading holes or going near charges and/or loaded holes. Personnel should immediately move away from magazines, caps and powder and, if carrying explosives, lay them down and move at least 100 feet away.

- Before the electrical storm arrives, lower the mast on seismic hole drilling equipment and move away from the drilling equipment and any near-by-electrical lines.
- Disconnect all lines from the recording truck. Make sure cables and geophones are not touching fences.
- 2-way radios should be held with the antenna pointing toward, but not touching, the ground or remove the antenna and avoid transmitting if possible.
- Stay away from flammable/explosive materials, metal objects, trees, powerlines, cables and fences.
- Suspend grounded vehicle operations and move clear of the vehicle.
- Suspend small boat operations and get out of the water.
- Stay in rubber-tired vehicles but not under trees.

### 14.2 Battery Charging

Precautions shall be taken when working around battery charging areas. These precautions consist of wearing appropriate eyewear to prevent chemical burns in the event of a battery discharge or explosion. Inspection of batteries should be done frequently for leaks or defects, and the battery repaired or replaced immediately.

## 15.0 MINIMUM EQUIPMENT SPACING REQUIREMENTS

The following equipment spacing requirements shall be followed unless otherwise directed by the Operator supervisor.

### FROM WELLHEAD (HYDROCARBON)

Test tanks, oil storage, pits----- 150' Generators  
 Direct-fired heater with flame arrestor 100'



100'

Circulating pumps----- 100'

Engine exhaust muffler----- 100'

Fuel storage Hydraulic power units (electric motor driven) 25'  
FROM PITS (NOT BURNING)

Fuel and ignition sources----- 100' Circulating pumps &  
hydraulic power units 100'

with spark arrestors----- 25' FROM HOT OIL TRUCKS

50'

Storage tanks Wellhead  
FROM VACUUM TRUCK ENGINES  
Tank FROM GAS VENTS

150'

50'

150'

Well and ignition sources 150'  
PLANT PROCESSING AREA

All internal combustion engines (vehicles, generators, welding machines, etc.) must remain outside the plant process area. No sources of ignition may be brought into the plant process area without approval of the Operator supervisor and a WORK PERMIT.

FROM POWER LINES

Less than 50KV

Boom, mast, gin pole, or load----- 10' Truck with boom, mast, gin  
pole lowered----- 6' Derrick, guy wire, geronimo lines 25'

50KV - 345KV

Boom, mast, gin pole, or load----- 20' \* Truck with boom, mast, gin  
pole lowered----- 10' Derrick, guy wire, geronimo lines 25'

345KV - 750KV

Boom, mast, gin pole, or load----- 35' \* Truck with boom, mast, gin  
pole lowered----- 16' Derrick, guy wire, geronimo lines 25'

\* Minimum distance should be ten (10) feet plus plus 1/2 inch for each 1 KV over 50 KV

16.0 HAZARDOUS ATMOSPHERES

16.1 Hydrogen Sulfide (H2S)

Hydrogen sulfide (H2S) is a highly toxic, flammable, colorless, and corrosive gas. H2S can cause immediate death, even when in inhaled in moderate concentrations.

Hydrogen sulfide (H2S) characteristics:

- H2S has an offensive odor, similar to rotten eggs, which rapidly deadens the sense of smell making odor an unreliable means of detecting this poisonous gas
- H2S is heavier than air and will tend to accumulate in low-lying areas

- H<sub>2</sub>S burns with a blue flame and when burnt, produces sulfur dioxide (SO<sub>2</sub>), which is another toxic gas
- Even at low concentrations, H<sub>2</sub>S can affect the eyes as well as the respiratory tract
- H<sub>2</sub>S is extremely corrosive to metal requiring careful material selection

Signs shall be posted in areas where H<sub>2</sub>S is present. Employees working in an H<sub>2</sub>S environment in excess of 100 parts per million (PPM) shall have H<sub>2</sub>S and respiratory protection training. The Permissible Exposure Limit (PEL) is less than 10 PPM.

## 16.2 Carbon Dioxide (CO<sub>2</sub>) and Nitrogen (N<sub>2</sub>)

Carbon dioxide (CO<sub>2</sub>) and nitrogen (N<sub>2</sub>) are non-toxic, non-flammable, colorless, tasteless and odorless gases. CO<sub>2</sub>, in high concentrations, has an acidic taste and a slightly pungent odor. Both CO<sub>2</sub> and N<sub>2</sub> are heavier than air and tend to accumulate in low-lying areas. Extended overexposure to CO<sub>2</sub> and N<sub>2</sub> blocks the intake of oxygen, stimulates breathing and increases the heart rate. This can result in discomfort, nausea, and ultimately unconsciousness and death.

Signs shall be posted in areas where CO<sub>2</sub> and N<sub>2</sub> are present. Employees working in areas where CO<sub>2</sub> and N<sub>2</sub> concentrations may be encountered shall be trained in their effects and the protective measures to be followed. The Permissible Exposure Limit (PEL) for CO<sub>2</sub> is less than 5,000 PPM. Oxygen (O<sub>2</sub>) content should be kept above 19.5% to avoid asphyxiation due to excessive concentrations of CO<sub>2</sub> and/or N<sub>2</sub>.

## AVENTA HSE HANDBOOK FOR EMPLOYEES

### ACKNOWLEDGEMENT

I hereby acknowledge that:

- (1) I have received a copy of, and read, this handbook;
- (2) I agree to work under all provisions contained herein;
- (3) I understand the handbook;
- (4) I am physically capable of performing the job.

Signature:

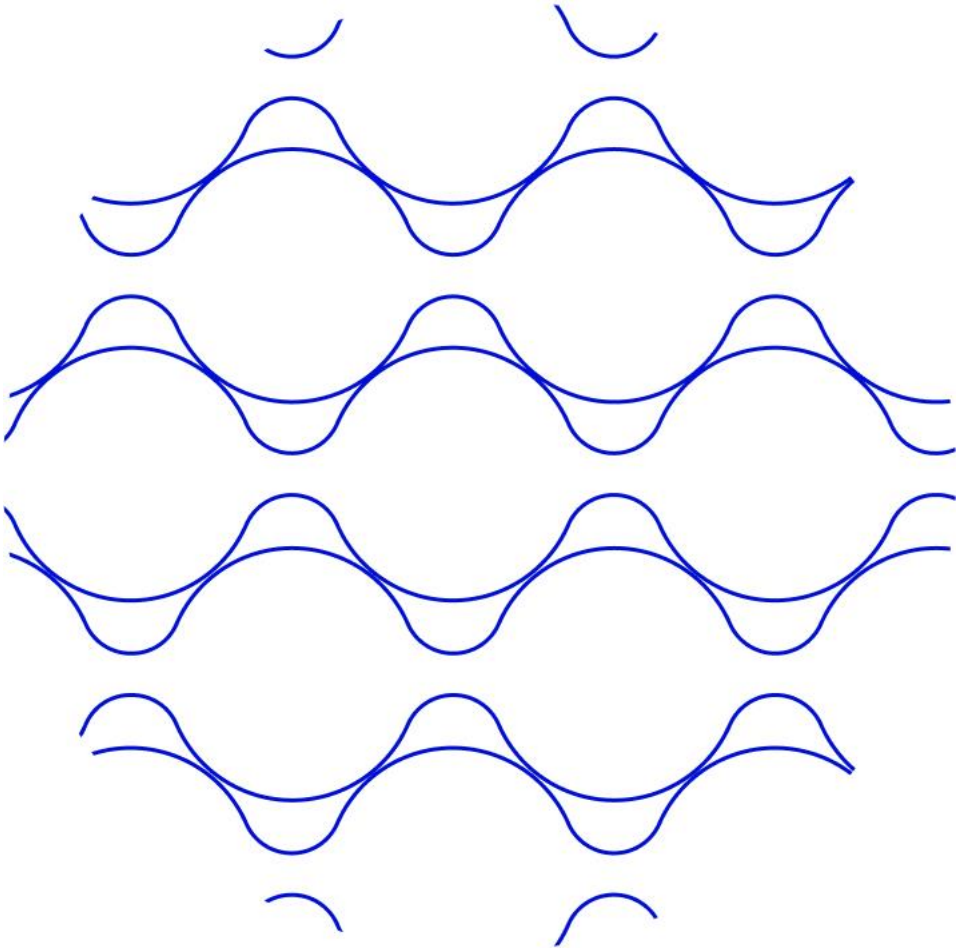
Name (Printed):

Social Security Number:

Date:

Contract Company:

This form to be placed on file at AVENTA's head quarter.



**Aventa**