



ConocoPhillips

Lower 48
HSE
Handbook



2022 Edition

Message From the Lower 48 Executive Vice President

Team,

The safety of our employees and contractors working in Lower 48 is foundational to our success. To support this, we are pleased to introduce the 2022 edition of the Lower 48 HSE Handbook which provides critical safety information for those working in Lower 48.

The Life Saving Rules and Process Safety Fundamentals are prominently featured to ensure you have easy access to some of our most important tools to keep you safe.

Our goal is to have one HSE management system consistently applied across Lower 48. In this edition, we have taken the opportunity to simplify our HSE requirements to operate with an independent mindset — oriented toward efficiency and action.

To achieve a workplace free of serious and significant incidents, we must be diligent in applying the requirements of the HSE Management System. To help ensure everyone returns home safely, we request that you ask these questions:

- Does this work have the proper level of oversight?
- Have we planned the job adequately, designed the equipment properly and identified and implemented task-specific hazards and mitigations?
- Do we know and understand the requirements that affect us?
- Are we and our contractors properly trained to safely complete the work?
- Have we completed a JSA utilizing the Lower 48 Go Card?
- Is everyone aware that they have the right and obligation to stop the job if there is anything unsafe or unclear?

Each of us is personally accountable for ensuring requirements are consistently applied across our assets and that we all go home safely each day. Please use this handbook to help us achieve success.

Jack Harper

Executive Vice President, Lower 48

At ConocoPhillips, our work is never so urgent or important that we cannot take the time to do it safely and in an environmentally responsible manner.

Lower 48 Safety Expectations

The following expectations apply to all personnel working on a ConocoPhillips Lower 48 location under operational control:

- Report all unplanned events and any injury, no matter how minor, to a ConocoPhillips supervisor as soon as possible.
- For injuries, call the asset's medical case management service (typically, this is Axiom 1-877-502-9466).
- Attend an asset-specific safety briefing or orientation before going to work.
 - If personnel have not worked on a Lower 48 ConocoPhillips location within 12 months, they must reattend a COP HSE orientation before going to work. Annual orientation is not required.
 - Contractors may provide the ConocoPhillips HSE Orientations specific to their personnel. This can be accessed through the external contractor site.
 - Visitors being escorted by COP personnel while on a work site, as well as delivery personnel, are not required to receive an HSE orientation.
 - Basin-specific orientation (e.g., Basin United) is encouraged but not required.
 - Personnel must attend a Safety Leadership Seminar (SLS) within six months per the SLS section of this handbook.
- Complete all required OSHA and COP HSE training for the applicable position.
- If available, follow the safe work procedures and guidelines for the job being completed.



If safe work procedures or guidelines are not available, and you feel the job is unsafe to start, exercise your Stop Work Authority!

- Use the Job Safety Analysis (JSA) process and Go Card to identify hazards and take appropriate action:
 - A JSA should focus on a few job steps at a time, then refresh the JSA as job steps are completed.
 - When hazards are identified, steps must be taken to eliminate or mitigate those hazards.
Note: “Be aware” or “Be careful” are not acceptable mitigations. Eliminate hazards or reduce their risk to an acceptable level with protective barriers (physical barriers, specialized equipment, procedures, etc.)
- Actively participate in the Safety program by observing, intervening and reporting.



STOP all unsafe acts that you see and have a meaningful discussion with the individual or crew such that they also understand the unsafe act and both of you agree on a safer alternative to complete the work

- Submit Hazard ID or similar reports for any potentially unsafe conditions you observe. These may include equipment, procedures or even lack of training or understanding.

HSE Management System

The Lower 48 HSE Management System is a detailed plan of:

- How to manage HSE risk and protect the health and safety of COP workers, contractors and nearby communities along with the environment.
- What the Lower 48 organization will do to comply with the corporate HSE MS Standard.
- The processes, programs and procedures (methods) used to plan, do, assess and adjust our system to continually improve HSE performance in each of the Elements of the Management System.

Note: More details on many of the subjects presented in this manual can be found by accessing the Lower 48 HSE Management System.

Table of Contents

Message from the Lower 48 Executive Vice President	2
Lower 48 Safety Expectations	3
The HSE Management System	4
Life Saving Rules (LSR) – Summary	9
LSR – Line of Fire	11
LSR – Work Permits*	13
LSR – Confined Space*	19
LSR – Working at Heights*	27
LSR – Lifting Operations*	37
LSR – Energy Isolation	48
LSR – Ground Disturbance/Excavation	58
LSR – Bypassing Safety Devices*	65
LSR – Driving Safety*	71
Process Safety Fundamentals*	77
Other HSE Topics	84
Abrasive Blasting	87
Air Compressors and Air Receivers	87
Asbestos (Respirable Fibers)*	88
Asset & Operating Integrity (A&OI)	88
ATVs, UTVs and Snow Vehicles	89
Axiom (Injury) Notification	90
Barricades	90
Benzene*	91
Bloodborne Pathogens*	92
Boomers, Binders and Come-Alongs	92
Burn Ban Conditions	93
Camlock Connections	93
Carbon Dioxide (CO2) and Nitrogen (N2)	94
Compressed Gas Cylinders	94
Contractor HSE Management*	95
Control of Work	96
Drilling and Well Servicing	97
Drug, Alcohol and Other Contraband Policy	98
Electrical Safety*	99
Emergency Response*	103
Environmental*	103
Ergonomics	106
Extracting Stuck Vehicles	106
Fatigue Management*	107
Fire Protection	109
First-Aid Kits	111
Flagging and Tagging	111
Grinders and Wire Brush Wheels	113
Grounding and Bonding	114
Hammer Unions	115
Handle Extensions (Cheaters)	116
Hand Tools	117

Table of Contents, *cont.*

Hazardous Communication (HazCom)*	119
Hearing Conservation*	120
Hot Oiling/Watering	121
Hot Work* (incl. Hot Tapping, Hot Tie-In and In-Service Welding)	122
Hydrates	126
Hydrogen Sulfide (H ₂ S)*	128
Hydrotesting	131
Knives/Razors	132
Ladder Safety.....	132
Lighting Burners on Fired Vessels.....	133
Lone Worker.....	134
Long-Term Isolations	135
Machine and Equipment Guarding	135
Management of Change (MOC)	136
Manual Lifting/Carrying Loads	137
Naturally Occurring Radioactive Material (NORM)*	138
Overhead Power Lines.....	139
Personal Protective Equipment* (refer to asset PPE Matrix).....	144
Pigging Operations	149
Pipe Handling and Storage	150
Post-Incident Management*	151
Pressure – Working with (Trapped, Systems, Venting/Bleeding).....	152
Pressure Washer Requirements.....	155
Pre-Startup Safety Review (PSSR)*	155
Pumping Units	156
Pumps.....	157
Purging Operations.....	157
Quality Management	158
Radiation Safety	158
Relief Devices*	159
Respiratory Protection*	160
Rotating and Reciprocating Equipment.....	161
Safety Leadership Seminar	162
Scaffolding.....	163
Short-Service Employee (SSE)	164
Signs	165
Simultaneous Operations (SimOps)	166
Slips, Trips and Falls.....	167
Static Electricity	168
T-Post Drivers	169
Temporary Equipment	169
Unmanned Aerial Systems (Drones).....	170
Unsecured Object Drops/Shifts/Rolls.....	171
Vac Truck Operation.....	171
Weather (Precautions and Related Illnesses)	171
Welding and Cutting.....	176
Wildlife and Vegetation.....	179

*** Topics with an asterisk* have an associated manual or procedure in the HSE Management System where additional details and instructions can be found.**

Appendices:

A: Charts, Tables and Formulas 181
 Anchor Selection Worksheet 182
B: Crane Signals 183
C: Flanges and Flange Bolt Dimensions 186
D: GHS Pictograms and Hazards 189
E: Loads on Blocks 190
F: Rigging Practices, Good and Bad 191
G: Wire Rope and Clips..... 193
H: Acronym List 194
I: GO Card 196
J: LSRV, Handbook, and Critical Activities QR 197



Life Saving Rules

Life Saving Rules

Further detailed on following pages



Line of Fire

Keep yourself and others out of the line of fire.



Work Permit

Obtain a valid work permit when required.



Confined Space Entry

Obtain authorization before entering a confined space.



Working at Heights

Protect yourself against falls when working at heights.



Lifting Operations

Follow safe lifting operations and do not walk under a suspended load.



Energy Isolation

Verify isolation before work begins.



Ground Disturbance/Excavation

Obtain authorization before starting ground disturbance/excavation activities.



Bypassing Safety Devices

Obtain authorization before bypassing, inhibiting or defeating a safety protection device or equipment.



Driving Safety

While driving wear your seat belt, do not use your mobile phone and do not exceed speed limits.



Line of Fire



Line of Fire

Keep yourself and others
out of the line of fire.

Critical Controls

The Critical Controls for Line of Fire are:

- **Establish**, maintain and honor barriers and exclusion zones.
- **Position** yourself and others to avoid line of fire hazards.
- **Protect** against dropped objects.

Barriers and Exclusion Zone

When establishing barriers and exclusion zones consider the following:

- Overhead lifts, pressure testing, moving equipment, overhead work, etc.
- Completeness, maintenance and communication of barricades.
- Adherence to barriers and exclusion zones.

Positions of People

When determining proper position of people during work, consider:

Pressure releases	breaking flanges and hose connections, removing plugs, blowing down equipment, pressure testing
Vehicles and heavy equipment	barricades, spotters, evaluation and planning of traffic patterns
Suspended and swinging loads	tethering of tools/equipment, management of loads with tag lines and guide poles, evaluation of centers of gravity and environmental conditions
Moving objects	unexpected movement of tools or equipment, securing of materials such as piping
Equipment in stress	(compression, tension or bent) — expected direction of energy release in a failure scenario
Pinch points	activities that subject people to crushing injuries

Prevent Dropped Objects

Protect against dropped objects:

- Secure tools and equipment from falling to a lower level.
 - Establish and maintain exclusion zones below overhead work.
-



Work Permit

Work Permit



Work with a valid work permit
when required.

Critical Controls

The Critical Controls for Work Permits are:

- **Verify** all isolations.
- **Perform**, evaluate and document initial and periodic atmospheric testing as required by the permit.

Scope of work

The scope of work must clearly describe:

- The work to be performed.
- The work location.

Competency

All persons working under the work permit must be competent to perform their assigned tasks.

Permit Requirements

Prior to the start of work, permit requirements must:

- **Be communicated** to all affected persons, including those who arrive after work has begun.
- **Account** for interactions with other work permits and any non-permitted Simultaneous Operations.
- **Define** methods for revalidation if needed.

Hazard Control/Mitigation

Confirm mitigation for all hazards identified on the permit prior to the start of work and as needed throughout the task.

Hot Work

Prior to and during any Hot Work activities:

- **Identify** and control all ignition sources.
- **Remove** or shield all flammable or combustible materials.

Changing Conditions

When conditions and/or work scope change:

1. **Stop** the work.
2. **Reassess** the hazards.
3. **Revise** the permit as necessary.
4. **Confirm/reconfirm** original and any additional hazard mitigation measures.

Work Permit 16

- When is a Work Permit required? 16
- When is a Work Permit not required? 16
- Who needs to approve a Work Permit? 16
- What questions should be asked during the Work Permit approval process?..... 16
- What is required to revalidate a Work Permit? 17
- How do I address Break-in Work? 17
- Where should a copy of the Work Permit be kept? 17
- When should a Work Permit be suspended? 17
- When should a Work Permit be canceled? 17

Work Permit

When is a Work Permit required?

A permit is required for the following nonroutine work activities:

- General Work*
- Class A & B Hot Work
- Confined Space Entry
- Excavation Work
- Lifting Operations
- Work requiring Energy Isolation
- Bypassing a Safety Device

***Note:** A Lower 48 General Work Permit is only required for facilities and locations falling under the requirements of OSHA Process Safety Management (PSM) or Class A/B facilities.

When is a Work Permit not required?

When “routine” work is being performed such as:

- Activities identified in the Lower 48 Permit to Work Manual.
- Identified as low risk per Lower 48 Risk Matrix.
- Systems with a voltage <50 Volts.
- Work not requiring a Lower 48 work permit.

Note: Work requiring a Task-Specific Permit (Hot Work, Confined Space Entry, Excavation, Bypassing Safety Device, etc.) is never considered routine.

Who needs to approve a Work Permit?

- A COP Supervisor or Superintendent (or designee) must approve the work scope.
- A COP Authorized Permit Writer must approve the work permit.

What questions should be asked during the Work Permit approval process?

- Is the work required?
- Is the Work Permit and documentation complete?
- Does the work involve a Management of Change? If Yes, has it been approved to implement?
 - Will this work involve SimOps on the site?
 - Are the proper approvals in place for any work in a hazardous area?
 - Are all the requirements understood by all parties?
 - Are all HSE and Process Safety risks understood, and appropriate mitigations planned or in place?
 - What is the impact on other activities in the area?

What is required to revalidate a Work Permit?

- Each covered asset/facility shall document a General Work Permit revalidation process. The General Work Permit can be revalidated six times for a total of seven shifts.
- All Task-Specific Permits are valid for the duration outlined in the specific manual.

How do I address Break-in Work?

- Verbal authorization is required from the associated Supervisor/Superintendent for unscheduled (Break-In) work for any activity added to the permit.

Where should a copy of the Work Permit be kept?

- At the work site.

When should a Work Permit be suspended?

When work is interrupted. Examples of work interruption include:

- Fire or gas alarms.
- Hazard introduction from SimOps.
- Conflicts with scope of work.



Work cannot resume until the Work Permit is reauthorized by the Authorizing Representative!

When should a Work Permit be canceled?

When the job scope changes. Examples of job scope changes include:

- LOTO is not completed.
- Work cannot be performed as planned.
- SimOps conflict that cannot be resolved.



Work cannot resume until a new Work Permit is generated and approved for issue!



Confined Space Entry

Confined Space Entry



Obtain authorization before entering a confined space.

Critical Controls

The Critical Controls for Confined Space Entry are:

- **Verify** all isolations are in place and effective.
- **Perform** all required initial, periodic and continuous atmospheric monitoring.
- **Prevent** unauthorized entry.

Energy Isolation

Verify that all energy isolations are in place and effective.

Acceptable isolation methods for confined space entries are:

- Blinding/Positive Isolation.
- Disconnecting process piping.
- Isolating all electrically driven/powered equipment.

Atmospheric Testing

Ensure atmospheric testing equipment is calibrated, inspected and maintained.

Perform, evaluate and document the following atmospheric testing:

- Initial.
- Periodic.
- Continuous, as required.

Establish and maintain ventilation as required by permit.

Confined Space Attendant

The confined space attendant's duties are:

- Maintain communication with entrants.
- Evacuate the space in the event of an emergency.
- Do not enter the confined space.
- Prevent unauthorized entry.

Emergency Response

Emergency response procedures and resources are in place.

Entry Authorization

The confined space entry permit requirements must be communicated to all entrants and the attendant(s).

The permit must be posted at the point of entry.

A log of personnel in and out of the space must be maintained when required.

Confined Space Entry 22

What is a Confined Space?..... 22

What is Entry? 22

What are the different types of Confined Spaces? 22

What defines a Regulated Confined Space? 22

What defines a Nonregulated Confined Space? 23

How to reclassify a Regulated Confined Space 23

How are Confined Spaces marked? 23

CSE Key Steps 23

What is some additional information for atmospheric testing? 24

Confined Space Entry

What is a Confined Space?

- A space that meets all of the following three requirements:
 - Is large enough and configured such that a person's entire body can enter.
 - Has limited or restricted means of entry or exit.
 - Is not designed for continuous human occupancy.

What is entry?

- Entry occurs as soon as any part of the body breaks the plane of an opening into the space.

What are the different types of Confined Spaces?

- Regulated Confined Space.
- Nonregulated Confined Space.

What defines a Regulated Confined Space?

- Contains or has the potential to contain a hazardous atmosphere that exposes employees to a risk of death, incapacitation, injury or acute illness from one or more of the following causes:
 - Oxygen concentration below 19.5% or above 23.5%.
 - Flammable gas, vapor or mist more than 10% of its lower explosive limit (LEL).
 - Airborne combustible dust at a concentration that meets or exceeds its lower flammability limit (LFL). This condition may be approximated when dust obscures vision to 5 feet or less.
 - A concentration of any substance that could result in employee exposure in excess of the permissible exposure limit (PEL), e.g., H₂S-Hydrogen Sulfide.
 - Any condition recognized as immediately dangerous to life or health.
 - Contains a material that has the potential for engulfing an entrant.
 - Has an internal shape such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes down and tapers in.
 - Contains any other recognized serious safety or health hazard.
- Regulated Confined Space requires an approved permit, completed in full and signed by a Supervisor, before work may proceed.

What defines a Nonregulated Confined Space?

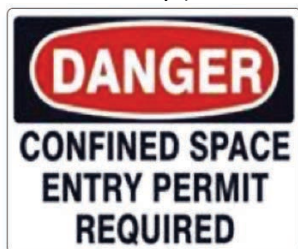
- The identified atmospheric, physical and occupational health conditions are within nonhazardous limits.
- For Nonregulated CSE entries complete the following sections of the CSE permit form.
 - General Information
 - Pre-Entry Preparation and Hazard Recognition
 - Atmospheric Testing
 - Classification Determination
 - Approvals
 - Permit Close-Out

How to reclassify a Regulated Confined Space

- A Regulated Confined Space can be reclassified as a Nonregulated Confined Space given:
 - The identified atmospheric, physical and occupational health conditions are reduced to within nonhazardous limits.
 - The reclassification is documented on the CSE permit form.

How are Confined Spaces marked?

- Signs or other effective means of warning must be posted on confined spaces that can be entered easily (without the use of tools or keys).



CSE Key Steps

1. Isolate energy sources using LOTO. If positive isolation cannot be accomplished, the double block and bleed method can be used, but the bleed/vent must be locked open and monitored during CSE.



A single closed block valve is never allowed as an isolation method for CSE!

2. Clean, purge and ventilate the confined space.
3. Test the entire confined space using a direct-reading instrument and record results on the CSE permit form.



When the LEL is greater than 0%, Operations/Projects Manager approval is required, and a COP representative must validate the permit and provide oversight on location during entry.

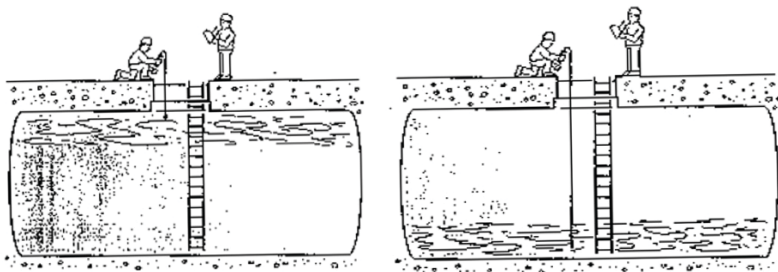
4. Complete a hot work permit if required.
5. Install barriers if needed.
6. Complete the CSE permit form and post near the entrance to the CSE.
Note: CSE Supervisor is not required to remain onsite for a Nonregulated CSE, so these duties will belong to the Lead Worker.
 If classified as a Regulated CSE the CSE Supervisor will remain onsite.
7. Ensure the rescue team, equipment and attendant are ready (not required for Nonregulated CSE).
8. Ensure continuous monitoring while entrants are in the confined space.
9. Document the atmospheric readings every two hours on the CSE permit form (not required for Nonregulated CSE).
10. If work exceeds beyond 12 hours revalidate the CSE permit form.
 The permit can be revalidated given the following are true:
 - The scope has not changed.
 - The crew has not changed.
 - For Regulated Confined Spaces, the CSE Supervisor has not changed.
 - Revalidation is authorized on the permit.
11. Revalidation involves:
 - Inspecting the confined space for any change in previous conditions.
 - Conducting and documenting air monitoring.
 - Reviewing the permit with all applicable personnel.
12. Complete a new CSE permit form if:
 - Permit duration exceeds 18 hours.
 - Entry spans a crew change.
 - A Stop Work Order is given.
13. STOP the work and remove entrants from the confined space if any unanticipated hazardous condition is detected during the entry.
14. Complete CSE by:
 - Removing all personnel and tools.
 - Installing a barrier at the entrance.
 - Conducting a debrief (not required for reclassified CSE).
 - Closing the CSE permit.

What is some additional information for atmospheric testing?

- Use a probe or extension on the testing equipment for confined spaces that are deep, have odd shapes or include remote areas.
- Individuals cannot physically enter a confined space to obtain a test reading without meeting the conditions of either a permit required or reclassified confined space entry.



When conducting atmospheric testing, make sure to test at multiple elevations/areas of the space to account for vapors/gases that are lighter or heavier than air!





Working at
Heights



Working at Heights

(Fall Protection)

Protect yourself against a fall when working at height.

Critical Controls

The Critical Control for Working at Heights is:

- **Maintain** 100% fall protection where required.
- **Plan** for fall prevention and/or protection when working from ladders.

Equipment Selection and Inspection

Before working at heights, a qualified person must:

- **Determine** if work can be completed at grade or in a manner not requiring personal fall arrest equipment.
- **Identify** rated anchor points, above the worker's head, where possible.
- **Inspect** all fall arrest equipment, including:
 - Full body harness with a D-ring attachment point.
 - Lanyards with shock absorbers or fall-limiting devices.
 - Dual action, self-locking snap hooks at each connection.
- **Remove** any damaged equipment from service.

Dropped Object Prevention

Protect against dropped objects by:

- Securing tools and equipment from falling to a lower level.
- Establish and maintain exclusion zones below overhead work.

Working at Heights

All personnel working at heights must:

- Maintain 100% fall protection where required.
 - Only work on scaffolding built, modified and inspected by a competent person.
 - Plan for fall prevention and/or protection when working from ladders.
 - Have an established rescue plan, including equipment to minimize suspension trauma in the event of an arrested fall.
 - Protect all wall and deck openings.
-

Working at Heights (Fall Protection) 30

- When are you required to use fall protection? 30
- How do you know when to use fall protection and what type? 30
- What are the different types of fall protection? 30
 - Hazard Elimination..... 31
 - Passive Fall Protection 31
 - Fall Restraint System 31
 - Fall Arrest System 31
 - Self-retracting Lanyard 33
 - Fall Arrest Shock-absorbing Lanyard 33
- Do fall arrest systems have to be attached to an anchor point? 34
- What are some other requirements for fall arrest systems? 35
- What are the rescue requirements when using a fall arrest system?. 36
- What do you look for when inspecting fall protection equipment? ... 36

Working at Heights (Fall Protection)

When are you required to use fall protection?

- At or above 4 feet when on a walking and working surface with an unprotected side or edge, when climbing/working on top of equipment (during **maintenance** activities), or working from fixed ladders without cages.
- At or above 6 feet when erecting scaffolds, when climbing/working on top of equipment (during **construction**-related activities), excavations, working in man lifts, or all other work at heights not described above.

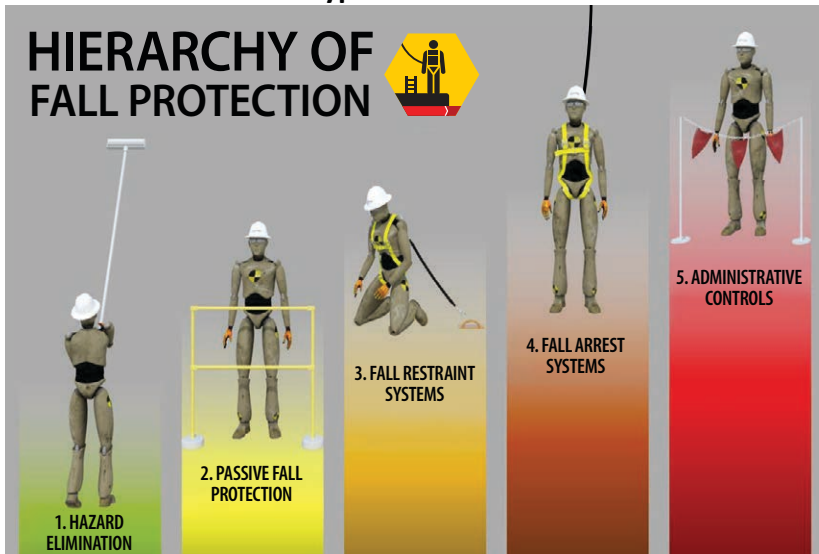


You must maintain 100% continuous use of a correct fall protection system!

How do you know when to use fall protection and what type?

- A Fall Hazard Assessment must be completed when the potential falls are either:
 - From a height described above.
 - Likely to cause serious harm falling from a lesser height.
- Note:** These requirements do not apply to trucks, trailers or railcars, unless at a loading/unloading rack.

What are the different types of Fall Protection?



Hazard Elimination

- Use alternate work methods to complete the task, eliminating the need to work at height.

Passive Fall Protection

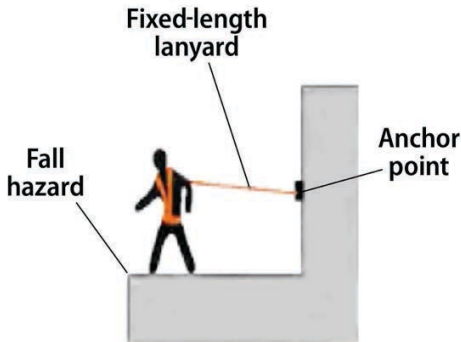
- Place physical barriers such as guardrails at unprotected edges and cover all holes. Ideally, permanent guard rails are installed when work is expected to be done at heights above 4 feet.



Installation of temporary or permanent guard rails at heights above 4 feet will likely require the use of either a fall restraint or fall arrest system!

Fall Restraint System

- A system designed to prevent the user from reaching a fall hazard.



- Restraint systems typically include a full body harness or a body belt and a lanyard or restraint line. No vertical free fall is permitted.
- The most common types of fall restraint systems include work positioning systems and fall restraint lanyards.

– A work positioning lanyard:

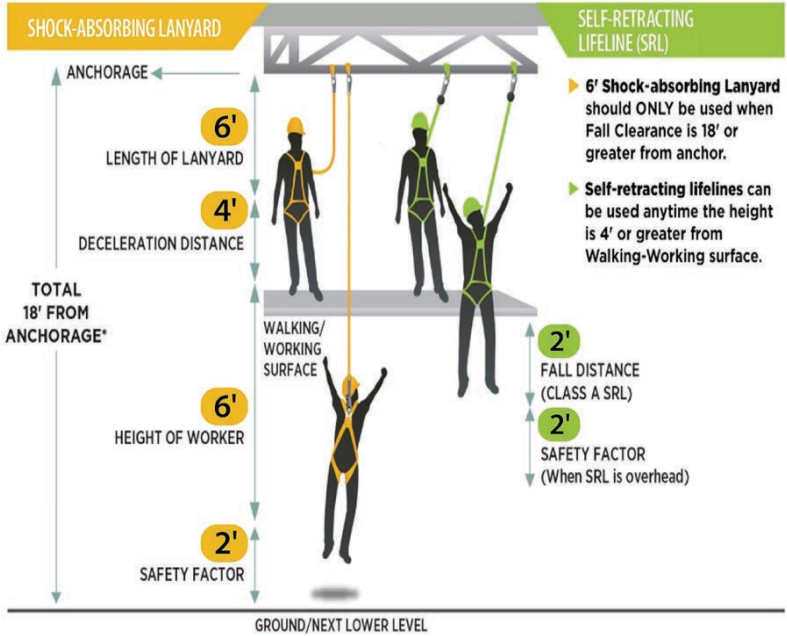


– Fall restraint lanyard:



- This is designed to prevent you from falling, not absorb the shock after a fall. It could be adjustable length or fixed length.

Fall Arrest System



Used to make sure workers only fall a safe distance with an acceptable level of force.



These systems shall be rigged so workers can neither free fall more than 6 feet nor contact any lower level!

- Normally consists of an anchor point, connectors and a full body harness and must include a lanyard, lifeline, deceleration device, shock-absorbing device or a suitable combination of these items.



Body belts cannot be used with a fall arrest system!



A custom fall arrest device must be provided for any employee whose combined tool and body weight is more than 310 pounds!

- The most common types of fall arrest systems are either shock-absorbing lanyards or self-retracting lifelines (SRL).

Self-Retracting Lanyard (SRL)

- A device containing a drum-wound line that slowly feeds from or retracts into the drum under slight tension while the user moves normally. It is attached to the fall arrest attachment on the body harness and automatically locks (i.e., prevents the line from feeding and thus, stops a fall) if the individual wearing it falls.



Fall Arrest Shock-absorbing Lanyard

- A fall arrest shock-absorbing lanyard typically will include a “shock absorber” identified by either a bungee cord hooked to the lanyard or a bundle of material at one end of the lanyard. It is designed to both stop a fall and absorb the shock after a fall occurs.





Notice that a typical 6-foot shock-absorbing Lanyard requires an anchor point at least 18 feet high to be effective! These devices typically have a limited use for ConocoPhillips.

Do fall arrest systems have to be attached to an anchor point?

- Personal fall arrest systems must be attached to an approved anchor point.
- The following Anchor Selection Worksheet may be used to determine the appropriate piping sizes and structural guidelines for anchor point selection in lieu of engineering design.

Pipe, Angle, Beam Width and Channel Sizing Chart					
Connection Parameters	Required Beam Section Modulus must be	Required Pipe Diameter (in.)	Required Angle (in.)	Required Beam Width (in.)	Required Channel Size (in.)
5,000-lb load to the midpoint of bracing spanning less than 5 ft.	Greater than 3	Greater than 4 in., Schedule 40	Greater than 6 in. x 6 in. x 3/8 in.	Greater than 4 in. x 13 in.	Greater than 6 in.
5,000-lb load to the midpoint of bracing spanning more than 5 ft., and less than 10 ft.	Greater than 6.5	Greater than 6 in., Schedule 40	No angles	Greater than 6 in.	Greater than 6 in.
1,000-lb load to the midpoint of bracing spanning less than 5 ft.		Greater than 2.375 in., Schedule 40	Greater than 3 in. x 3 in. x 3/8 in.	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 3 in.
Connecting a 3,000-lb load at midpoint of bracing spanning less than 5 ft.		Greater than 3.500 in., Schedule 40	Greater than 6 in. x 4 in. x 1/2 in.	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 4 in.
Connecting a 1,000-lb load at midpoint of bracing spanning more than 5 ft., but less than 10 ft.		Greater than 3.500 in., Schedule 40	Greater than 4 in. x 4 in. x 3/8 in.	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 4 in.
Connecting a 3,000-lb load at midpoint of bracing spanning more than 5 ft., but less than 10 ft.		Greater than 4.500 in., Schedule 80, or 5.625 in., Schedule 40	No angles	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 6 in.

–Fall Arrest

- Noncertified anchor: 5,000 lb. static strength
- Certified anchor: designed, selected, installed and used under the supervision of a qualified person; static strength two times maximum arresting force

–Work Positioning

- Noncertified anchor: 3,000 lb. static strength
- Certified anchor: static strength two times foreseeable force

–Restraint and Travel Restriction

- Noncertified anchor: 1,000 lb. static strength.
- Certified anchor: static strength two times foreseeable force.
- All anchor points are to be designed to support 5,000 pounds for each personal fall arrest system attached or designed with a safety factor of at least two.
- Locate the attachment point for a body harness only in the center of the back near shoulder level.
- Ensure that D-rings on the sides of the body harness are used only for attaching positioning devices.
- Verify that anchor points used for attachment of personal fall arrest equipment are independent of any anchor point being used to support or suspend platforms.
- Locate the anchor point directly above the individual's head to eliminate the hazards of "pendulum-type" swing falls and locate it above shoulder height whenever possible.
- Attach personal fall arrest systems to guardrail systems only if a registered professional engineer with experience in designing fall protection systems or a Qualified Person with appropriate education and experience approves the guardrail system as an anchor point.



A crane or boom can be used as a tie-off point if it is appropriately rated, and de-energized (unless it is being used for a rescue situation)!

What are some other requirements for Fall Arrest Systems?

- Personal fall arrest devices must be used when fall hazards cannot be eliminated or prevented by other means.
- Personal fall arrest devices must be used when working in a crane-suspended basket or platform.

- Personal fall arrest device or a fall restraint system must be used when working from an aerial lift as follows:
 - Body belt (or body harness) with a tether (i.e., lanyard without a shock absorber) anchored to the boom or basket that does not allow a worker to fall out of the basket.
 - Body harness with a tether (e.g., 3-foot lanyard with shock absorber, self-retracting lanyard) anchored to the boom or basket rigged such that an individual can neither free fall more than 6 feet nor contact any lower level.
- Only one personal fall arrest system can be attached to a single vertical lifeline.
- Lanyards must be free of knots and no longer than 6 feet including connectors and shock absorber.
- A separate fall arrest system (e.g., harness, lanyard and anchor point) must be used that is independent from descent control equipment.
- For rig work, the derrickman is expected to wear both fall restraint and fall arrest (typically SRL) when the ability to fall is not completely eliminated by the fall restraint.

What are the rescue requirements when using a Fall Arrest System?

- Emergency rescue plan must ensure personnel are rescued within 20 minutes after a fall occurs using a personal fall arrest system.
- Availability and need for additional equipment, rescue personnel, ladders, etc., must be considered as part of the plan.
- COP and contractor rescue plans must be reviewed in the JSA discussion.

Note: Fall arrest systems that allow for self-rescue can be purchased.

What do you look for when inspecting fall protection equipment?

- Personal fall protection equipment and components must be inspected before each use for signs of the following:
 - Distorted snap-hooks or faulty hook springs.
 - Mildew.
 - Wearing or internal deterioration in the lanyards.
 - Contact with fire, acids or other corrosives.
 - Damage due to deterioration.
 - Defects (cuts, tears, abrasions, undue stretching).

Note: Equipment removed from service must not be used again until inspected by a competent person.



Lifting Operations

Lifting Operations



Follow safe lifting operations
and do not walk under a
suspended load.

Critical Controls

The Critical Controls for Lifting Operations are:

- **Establish**, maintain and honor barriers and exclusion zones.
- **Do not walk** under a suspended load.
- **Confirm** all lifting equipment is rated for the load.

Competency Requirements

Ensure all employees meet competency requirements for their tasks, including:

- Lift plan preparers and approvers.
- Lifting equipment operators.
- Riggers.
- Signal persons.
- Lift supervisors.

Equipment Inspections

Conduct the required inspections of the following equipment:

- Lifting equipment.
- Rigging components.
- The load to be lifted and any rigging attachment points.

Ensure load limits and inspection dates, as required, are clearly marked, understood and appropriate for the load. Ensure that third-party certifications of all lifting equipment and components have been completed.

Suspended Loads

When loads are suspended:

- Establish clear escape routes.
- Establish an agreed-upon set of standard hand signals.
- Establish a communication plan for blind lifts.
- Do not walk under a suspended load.
- Utilize tag lines or other assist devices to guide and set load.

Critical Lifts

Complete a Critical Lift plan when required.

Barriers and Exclusion Zones

Establish, maintain and honor barriers and exclusion zones.

Lifting Operations..... 40

- What are the basic rules for mechanical lifts? 40
- What are some of the signaling/communication requirements? 41
- What qualifications must a Crane Signaler have? 42
- What are some of the Rigging requirements? 42
- What qualifications must a Rigger have? 43
- What is a Critical Lift?..... 43
- When can mechanical lifting equipment be used for
lifting personnel?..... 44
- What training must a Crane Operator have? 44
- When should cranes be inspected and documented? 44
- What are the basic safety rules for operating a forklift? 45
- What are some of the basic safety rules for
Gantry cranes and hoists? 45
- What are some basic safety rules when using a gin pole truck?..... 46
- What are some of the basic safety rules for using
alloy steel chain slings? 46

Lifting Operations

What are the basic rules for mechanical lifts?

- Load limits must be clearly marked on all lifting equipment.
- Visual inspection must be conducted for lifting devices, associated equipment and the load rigging.
- Only qualified personnel or trainees supervised by qualified personnel can rig, operate, inspect or maintain mechanical lifting equipment.
- The Operator must remain at the controls when a lift is in progress.



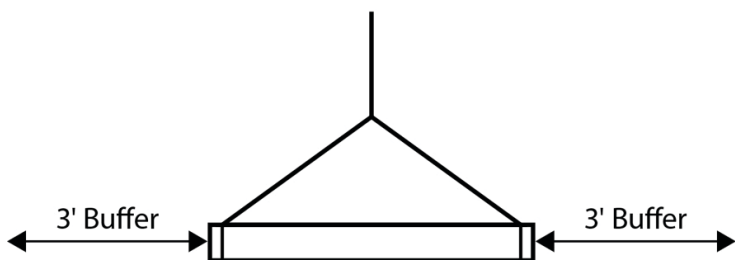
Reference the Overhead Power Lines section for requirements when operating “elevating” mobile equipment around power lines.



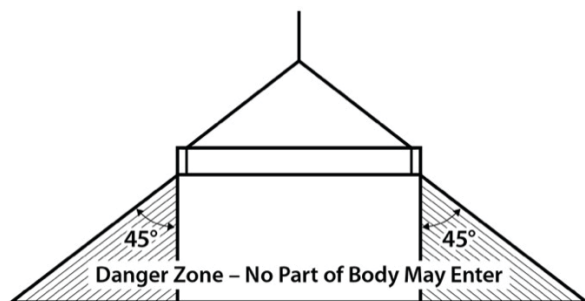
Do not leave a suspended load unattended!



Maintain a safe (3' minimum) buffer zone when mechanical equipment is in operation except for operations where special precautions are taken, such as pipe tripping and other rig floor operations.



Maintain a buffer zone within 45-degree angle of the load, if practicable. Before lifting, verify tag lines or stiffy tools are long enough to maintain a 45-degree angle during the lift.



- The Operator must verify all personnel are clear of the buffer zone prior to actuating equipment.
- Personnel must never enter the buffer zone until the Operator has moved his hands away from the controls, established eye contact, and gives the go-ahead.



Never place any part of your body under a suspended load — not even for an instant!

- Do not carry loads over personnel.
- Never reach for a falling or swinging object to stop its movement.



Always use a tag line (without knots or loops on the end) or Stiffy tool to guide, snub and control the load! Multiple lines/tools may be needed!



Never place hands on a suspended load unless required for precision alignment (e.g. final fit up, bolt on activities). In this case, ensure signaler has given the go ahead, place hands a safe distance from mating surfaces, and keep hands/body out of the line of fire.

- Rope ends of taglines must be braided, taped or left frayed.

What are some of the signaling/communication requirements?

- A signal person must be assigned when:
 - The Operator does not have full view of the operation.
 - The Operator or person handling the load determines a signal person is needed.
 - Site-specific safety concerns are raised.

- When the Operator cannot see the primary signaler, a second signaler must be used to:
 - See both the primary signaler and operator.
 - Relay signals from the primary signaler to the Operator.
- For blind lifts, the spotter and signal person shall have radio communication with the equipment operator and the signal person shall maintain direct visual contact with the operator.
- All hand signals from a designated signaler must be obeyed (see Appendix for hand signals)



A stop signal must always be obeyed regardless of who gives the signal!

- Signalers should be identified by either an orange hard hat, orange gloves, or orange vest.

What qualifications must a crane Signaler have?

- Documented qualification from:
 - A third-party qualified evaluator.
 - The employer's qualified evaluator.
- Documentation must be available at the worksite.

What are some of the Rigging requirements?

- Rigging of slings and other lifting equipment must be performed only by a qualified Rigger, or trainees under the direct supervision of a qualified Rigger.



Rigging must be inspected at the beginning of each work shift or prior to each use and removed from service after a failed inspection!

- Below are examples of damage to rigging equipment that would require its removal from service:



KINKING



DOGLEGS



BIRDCAGING



SEVERE WEAR



BROKEN WIRES



CORROSION



DAMAGED FITTINGS



ILLEGIBLE TAG/ID



CHEMICAL DAMAGE



HEAT DAMAGE



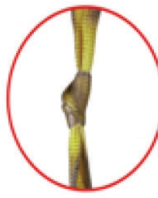
HOLES, CUTS, TEARS



BROKEN/WORN STITCHES



WEAR/ABRASION



KNOTS



UV DAMAGE



DAMAGED FITTINGS

What qualifications must a Rigger have?

- One of the following:
 - Recognized degree.
 - Recognized certificate.
 - Recognized professional standing.
 - Extensive knowledge, training and experience.

What is a Critical Lift?

- A critical lift plan shall be developed for any of the following situations:
 - More than one crane is supporting a load.
 - Load weight is greater than 75% of the weakest rigging assembly.

- Lifting over operating process equipment.
- Lifting personnel with a crane or boom truck. Refer to the Lifting Operations manual for additional requirements.
- Consider the following factors when determining if a lift is a critical lift:
 - Requirements for exceptional care in handling.
 - Load size.
 - Load weight.
 - Close tolerance installation.
 - High susceptibility to damage.
 - High wind.
 - Visibility.
- A drawing/sketch of the rigging shall be included in the critical lift plan, including the swing radius. The critical lift plan shall be reviewed and approved by the ConocoPhillips Supervisor responsible for the work prior to the lifting operation.
 - Conduct a pre-operation meeting prior to a critical lift and cover:
 - Job Safety Analysis (JSA).
 - Drawing/Sketch.
 - Roles and responsibilities of personnel involved in the lift.



A COP representative shall remain on-site from the time the load is lifted until it has been moved and is securely in place.



A Critical Lift Plan is required!

When can mechanical lifting equipment be used for lifting personnel?

- The use of lifting equipment to hoist personnel is prohibited except where it's demonstrated that the erection, use and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous, or is not possible because of the project's structural design or worksite conditions.



Forklifts shall not be used to hoist/lift personnel.



Lift of personnel using mechanical lifting equipment is classified as a critical lift.

What training must a crane Operator have?

- Certified for the type and capacity of crane to be operated.
- Qualified by one of the following:
 - Certification from an accredited crane operator testing organization.
 - Qualification from their employer through an audited employer program.
 - License from a state or local government meeting the minimum requirements set forth by OSHA.

When should cranes be inspected?

- Lifting equipment shall be inspected and maintained in accordance with manufacturer's recommendations and regulatory requirements.
- Deficiencies found during inspection must be corrected before the equipment is placed back into service.
- Conduct visual inspections of all lifting equipment, rigging and lifting devices at the beginning of each work shift or prior to use.

Each crane must have an anti-two-blocking device to prevent contact between the load block and boom tip and between the Overhaul ball and the boom tip!



Anti-two-blocking device must never be bypassed!

What are the basic safety rules for operating a forklift?

- Forklifts must have an automatic device that signals when the vehicle is backing up, such as a horn, whistle or gong.
- Forklifts must be inspected daily before use.
- A seat belt must be worn while operating a forklift.
- None of the following are allowed on a forklift:
 - Riding on any area of the forklift not specifically designated for human occupancy.
 - Standing under or passing under the elevated portion of a forklift regardless of the load.
 - Must not be operated near overhead installations.
- Never lift a load with one fork.
- Unattended forklifts must be left in the following condition:
 - Fully lowered.
 - Controls in neutral.
 - Power shut off.
 - Brakes set.

What are some of the basic safety rules for Gantry cranes and hoists?

- Warnings and legends designed to alert the operator to the hoist, load block and controls are required.
- The rated load of the crane must be plainly marked on each side.
- A monthly inspection must be performed and documented.
- A daily pre-use inspection must be conducted on all Gantry cranes and hoists.
- Hoists must be installed in a way that allows the Operator to always remain clear of the load.
- Hand chain-operated hoists must be operated with hand power only and with no more than one operator per hand chain.



Lever extension (cheater) must not be used on manual lever-operated hoists!

What are some basic safety rules when using a gin pole truck?

- Trucks equipped with winches must have “headache” guards to protect the cab and driver.
- Winches and pole truck must never operate within 10 feet of energized electrical lines.
- Operator must never leave the controls while load is suspended.
- Personnel must not approach a suspended load until:
 - The operator’s hands are moved away from controls.
 - The signaler has given the go-ahead.
- Personnel must be clear of the load with no body parts:
 - Between the load and another object.
 - Under any part of a load suspended on the winch and gin poles.
- Do not touch a moving line and do not allow the line to slide through someone’s hands.
- The load must be secured before moving the truck.



Do not use Snap Boomers!

- The gin poles must be secured when in the raised position.
- The line hook must be secured, the line pulled snug and the brake set.

What are some of the basic safety rules for using alloy steel chain slings?

- Only alloy steel chain with a design safety factor of 4 to 1 is acceptable for sling/lifting use.
- All alloy steel chain slings shall have permanently affixed durable identification tags stating the size, manufacturer's grade, rated load capacity, reach, number of legs, and sling manufacturer.
- A serial number or other means of identification is required either on the manufacturer's tag or a separate tag.
- All attachments shall have a rated load at least equal to that of the alloy steel chain with which they are used.
- Lift each groove from its seat and inspect for grooving. Where grooving is noticeable, check the stock diameter for reduction in area. If the reduction in diameter is 10% or greater, the sling shall be discarded.
- Every new, repaired, or reconditioned alloy steel chain sling shall be proof-tested by the manufacturer or an equivalent entity. A certificate of proof test shall be maintained on file.



Energy
Isolation



Energy Isolation

(Lockout/Tagout & Try)

Verify isolation
before work begins.

Critical Controls

The Critical Controls for Energy Isolation are:

- **Identify** all potential energy sources.
- **Isolate**, Lock and Tag all energy sources.
- **Verify** absence of energy before start of work (Try).

Identifying Energy Sources

Energy sources must be:

- Identified by Authorized Persons.
- Documented on applicable permits, LOTO plans, isolation certificates, etc.

Isolating equipment

All isolations must be performed by an Authorized Person.

Locking and Tagging equipment

Locks and Tags must:

- Be placed on each isolating point while work is being performed.
- Prevent the operation of the isolating device.
- Clearly identify isolation points and lock owner.
- Be removed only by Authorized Persons.

Isolation locks and keys must be strictly controlled.

Verify Zero Energy (Try)

Absence of energy must be confirmed:

- Prior to the start of work.
- After work breaks, as necessary.
- As required by permits or LOTO plans.
- By opening bleeder valves, operating start/stop switches, testing for hazardous materials, testing for absence of voltage, etc.

A walk-through of the isolation and verification of zero energy must be performed, at a minimum, with the responsible person and the lead worker.

Energy Isolation (Lockout/Tagout & Try)

Lockout — a method of ensuring that an energy-isolating device and the machines or equipment being controlled cannot be operated until the lockout device is removed.

Affected Personnel — individuals whose jobs require them to operate or use machines or equipment on which service or maintenance is being performed under lockout or tagout, or whose jobs require them to work in the immediate vicinity of servicing or maintenance being performed.

Authorized Personnel — COP employees or contract personnel who have been designated by their supervisors and trained to be responsible for servicing or maintaining machines or equipment under lockout.

Qualified Person — person who has received electrical training and is capable of working safely on energized circuits; is familiar with the proper use of special precautionary techniques, personal protective equipment (for shock hazards and Arc flash requirements), insulating and shielding materials, and insulated tools; and can recognize and avoid the electrical hazards that may be present with respect to that equipment or work practice.

What are the different types of LOTO & Try?

- Individual.
- Group.
- Group using the Permit Process.

What are the seven main parts of LOTO & Try?

- 1.Preparation for Energy Isolation.
- 2.Equipment Shutdown.
- 3.Isolation of Energy.
- 4.Release of Stored Energy.
5. Verification of Isolation and Try.
- 6.Inspection and Notification.
- 7.Release from Lockout.

When is LOTO & Try required?

- Anytime there could be an unexpected release of energy while performing maintenance or repairs (servicing) on a piece of equipment.
- There are situations where the LOTO processes (locks, tags, EIP, etc.) are not required when isolating equipment; however, all the following stipulations must be met:
 - The individual is working alone, isolation points are within visual range and the isolated equipment is under exclusive control.
 - This is a minor, routine activity that takes place during normal operations.
 - Work while the energy source is isolated cannot expose other individuals to hazards.

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 - This is a minor, routine activity that takes place during normal operations.
 - Work while the energy source is isolated cannot expose other individuals to hazards.

- Hazardous energy is easily identified and isolated.
- Isolation of the energy source has been verified through Try.
- The machine or equipment has no residual energy after shutdown which could endanger personnel.
- The potential consequence associated with the isolation is low.



You must still isolate and verify zero energy when LOTO is not required. See the LOTO manual for more details.

Who performs LOTO & Try?

- A trained, qualified and authorized person who has demonstrated the skills and knowledge to safely isolate equipment.

Who else is involved in LOTO & Try?

- All Authorized Personnel working on equipment under LOTO & Try must verify isolation and de-energization has been effectively accomplished before working on equipment.

What locks and tags should be issued for LOTO & Try?

- **Red Individually keyed or combination personal locks and tags issued only to personnel trained as COP Authorized Persons.**

- **Yellow locks, tags and lockboxes issued only to personnel trained and authorized in COP Group LOTO & Try procedures.**

- **Blue shift-change locks and tags issued only to personnel who are expected to be involved in the COP shift change process.**

When should you use LOTO & Try tags?

- With red, yellow or blue locks when isolating energy under LOTO & Try to indicate equipment must not be operated.
- When equipment is not capable of being locked out, LOTO & Try tags alone can be used.



Operational Tagging is not allowed as a substitute for LOTO & Try!

What do LOTO & Try tags look like?

- LOTO & Try tags must have the following:
 - Name of authorized person who attached the tag.
 - Authorized person's phone number.
 - Date the tag was attached.
 - Reason for LOTO & Try.
 - Specified colors of red, black and white per ANSI Z53.1-1967.



What is an Energy Isolation Procedure (EIP)?

- An EIP is a document (developed on-site or pre-built) that explains how to control hazardous energy effectively during LOTO & Try.



OSHA requires an EIP before each occurrence of LOTO & Try isolation!

When is single point isolation during LOTO & Try **NOT** allowed?

- During Confined Space Entry (requires positive isolation) (see Confined Space Entry section).
- During Class A Hot Work (see Hot Work section).



Positive isolation is required for Class A hot work on tanks, drums or vessels!



Push buttons and selector switches are never allowed for isolation!

What does it mean to “Try” during LOTO & Try?

- Verify the energy source has been isolated by trying to turn on switches, checking voltage, opening valves or opening bleed valves to ensure there is no pressure/energy in the system.

When should “Try” occur during LOTO & Try?

- Before starting work on machines or equipment that has been locked or tagged out.

When can a contractor perform LOTO & Try on COP property or equipment?

- If they have approval from COP Line Supervision and have been trained as a COP Authorized Person.

Note: Contractors must use COP LOTO & Try processes or their own OSHA compliant program.

LOTO & Try Key Steps:

1. Identify job scope and need for isolation.
2. Determine if LOTO is needed. If so, create EIP for the job.
3. Contact Operations and communicate the job scope and the EIP for operational sites on in-service equipment.
4. Determine if the equipment has a required SOP for shutdown.
5. Plan the isolation method that will be used for the EIP.
6. Request Permit-to-Work, if applicable.
7. Assemble locks, tags and other required equipment.
8. Conduct a pre-job safety meeting.
9. Check the EIP in the field to confirm the accuracy of P&IDs or other diagrams and that all isolation points are identified and included.
10. Notify Affected Personnel at the site that LOTO & Try will occur.
11. Shut down equipment by following the Standard Operating Procedure (SOP) if it exists.
12. Identify and Isolate energy by placing energy isolation points in safe position as indicated by the EIP.
13. Release any residual hazardous energy by dissipating, venting or draining residual energy per the method defined in the EIP.
14. Attach lockout device and tag to energy isolation points.
15. Retain sole possession of the lock key(s).
16. Inspect the attachment of LOTO devices (locks and tags) to ensure placement meets the EIP.
17. Verify equipment is de-energized.
18. Complete a secondary review and verification of installed EIP.
19. Confirm by signature on the EIP that isolation steps are complete, and the system can be worked on.

20. Ensure persons working on the isolated equipment have confirmed/verified the isolation and documented this as per the EIP.
21. Issue clearance for the work to begin.
22. Reverify energy isolation prior to starting work or if conditions change.
23. Verify that work is complete.
24. Inspect the work area to ensure tools are removed and guards replaced.
25. Remove LOTO (**follow steps for Group LOTO – If applicable**).
26. Ensure everyone is positioned safely and affected personnel are notified that LOTO has been removed.
27. Notify operations for any in-service equipment or pipelines.
28. Restore energy to the equipment.

Shift Change LOTO & Try extra steps



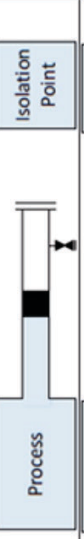



1. Remove personal red locks and tags from the lockbox.
2. Install a blue shift lock on the lockbox.
3. Ensure new shift authorized person (primary authorized person in the case of Group LOTO & Try) removes blue shift lock and replaces it with personal red lock and tag.
4. Ensure lead group workers coming on shift (in the case of a Group LOTO & Try) install personal red locks and tags to the lockbox.
5. Verify reapplication of personal locks and tags according to EIP.

When can someone else's lock be removed from LOTO?

- With approval from supervisor and completing the Emergency/Non-Owner Lock Removal Form.









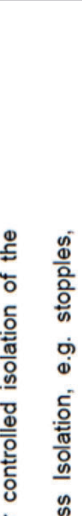
Standard Isolation Methods and Schemes

(Process Isolation Standard, Sec. 7.1)

Isolation Methods	Guidance	Isolation Schemes	Illustration/Example
I Blinding / Positive Isolation	Complete separation from Hazardous Fluid.	Blinding, supported by Proven Isolation	
	Guidance Note: If required by Minimum Isolation requirements given in Section 7.3.	Blinding, supported by Non-Proven Isolation	
		Blinding, supported by Non-valve Isolation	
		Double Pressure Barrier and bleed	
II Proven Isolation	Use of verified Pressure Barriers.	Single Pressure Barrier and bleed	
	Minimum Isolation Requirements given in Section 7.3.	Non-valve Proven Isolation	

Standard Isolation Methods and Schemes

(Process Isolation Standard, Sec. 7.1) cont.

III Non-Proven Isolation	Use of Pressure Barrier(s) which is/are not verified prior to Break of Containment.			
  	Use of Pressure Barrier(s) which is/are not verified prior to Break of Containment.	Double Pressure Barrier Isolation		
		Single Pressure Barrier Isolation		
		Non-valve Non-Proven Isolation		
			<ul style="list-style-type: none">- Represent an individually actuated valve designed for controlled isolation of the process system.- Represent any specialized technique used for Process Isolation, e.g. stopples, pipeline plugs, crimping, freezing, etc.- Represents a valve that is not designed for controlled isolation of process fluids.	

Use of any specialized non-valve isolation techniques (e.g. stopples, pipeline plugs, crimping, freezing, etc.) requires an engineering assessment in accordance with section 7.4 confirming the suitability of the proposed isolation technique.



Ground Disturbance/ Excavation

Ground Disturbance/Excavation



Obtain authorization before starting ground disturbance or excavation activities.

Critical Controls

The Critical Controls for Excavation are:

- **Identify** all underground services.
- **Verify** all isolations are in place and effective.
- **Enter** excavations only with appropriate protective systems in place.

Underground Services

Prior to and during excavation activities, underground services must be:

- Positively identified.
- Marked and markings maintained.
- De-energized when required.

Energy Isolations

Verify absence of energy for any associated energy isolations.

Entering Excavations

Never enter an excavation before:

- Determining if a confined space entry permit is required.
- A competent person has inspected the excavation.
- An appropriate protective system is in place and inspected, as required.
- Verifying a safe means of access and egress.

Excavation Equipment

When excavation equipment is in use:

- Utilize competent spotters to:
 - Aid in identification of underground hazards.
 - Warn personnel of heavy equipment movement.
 - Identify and communicate overhead hazards.
 - Establish, maintain and honor barriers and exclusion zones.
-

Ground Disturbance/Excavation 61

- Excavation 61
- Competent Person 61
- Who is involved with Excavation? 61
- What must be done before beginning an Excavation? 61
- What must be done during an Excavation? 62
- What must be done when work is completed in Excavation? 63

Ground Disturbance/Excavation

Excavation — any man-made cut, cavity, trench or depression in the earth's surface, formed by earth removal.

Competent Person — a person who:

- Has completed Excavation and Trenching Competent Person Certification Training.
- Can identify and predict hazards in the surroundings or working conditions.
- Is authorized to take prompt corrective measures to eliminate hazards.

Who is involved with Excavation?

- A Competent Person must be designated for all work in or around excavations.
- Excavations exceeding 20 feet in depth must be designed by a Registered Professional Engineer.

What must be done before beginning an excavation?

- Follow state and local requirements pertaining to One-Call or Call-Before-Digging notification system (the number for One-Call is 811 – in most locations).



**Know what's below.
Call before you dig.**

- Contact utility companies or owners within established or customary local response times when a One-Call system is not available.
- Use line-finding equipment (e.g., line finders) before excavating to:
 - Locate and/or verify underground installations when the exact position of such installations cannot be determined through other means.
 - Confirm underground installations before the positions of underground installations are finalized.
- Provide ground “markings” to identify the location of utility installations.
- Post warning signs where buried hazards and likelihood of public access to area warrant them.
- A Competent Person must complete the excavation permit and give approval to onsite workers to begin the excavation.

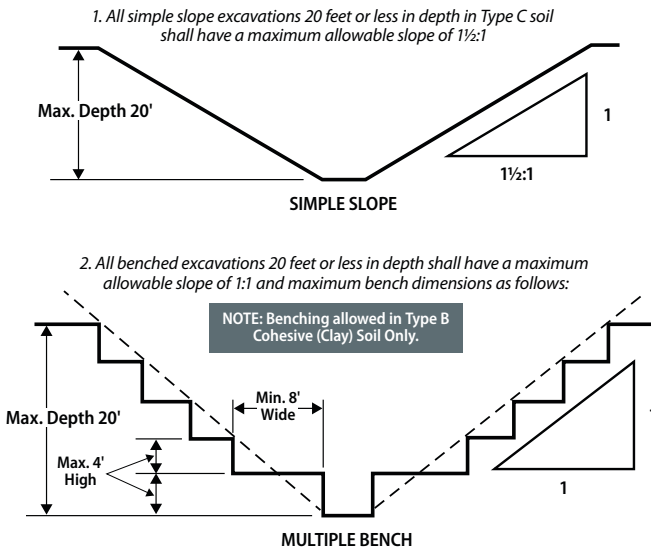
What must be done during Excavation?

- A Competent Person must monitor the depth of digging using a probe or alternate means when excavating down to an underground installation such as a pipeline or electrical cable.
- The equipment operator must maintain visibility of the uncovered line during the excavation.



Personnel are prohibited from being in an excavation while digging is occurring!

- Maintain all visible markers that show the location of underground installations during the job.
- Follow Confined Space Entry requirements when entering an excavation or trench that is:
 - More than 4 feet deep and
 - Has potential for a hazardous atmosphere.
- Control atmospheric hazards identified in excavations and trenches less than 4 feet deep before allowing personnel to enter.
- Personnel must be protected from cave-ins when deeper than 4 feet by sloping, benching, shoring/shielding. Type C soils must be sloped and be no steeper than 1.5:1 (1.5 horizontal to 1.0 vertical, or a 34-degree maximum slope). Type B soils (cohesive clays) allow for benching or sloping up to a maximum of 1:1.



- Excavations must not undermine sidewalks, pavements or other structures unless a support system is already in use to protect personnel from possible collapse of these structures.
- Excavated materials must not be placed closer than two feet from excavation edge.
- Provide a stable and safe means for entering and exiting excavations such as a ladder, stairway ramp, benched steps and/or additional sloping for personnel working at any depth.
- When excavation is more than 4 feet deep, personnel must be protected from cave-ins with a system such as sloping, benching, shoring and/or shielding unless one of the following conditions is true:
 - Excavation is made entirely in stable rock.
 - There is no indication of potential cave-in.
- Personnel must be protected by guardrail systems, fences or barricades at the edge of excavations that are:
 - More than 6 feet deep.
 - Not readily seen because of plant growth or other visual barriers.
- Investigate adjacent lines of the area being excavated and determine actions to be taken to ensure the area is safe for excavations.



Electrical lines within 2 feet of digging must be de-energized! (Within 3 feet in Uinta due to terrain).

- Use hand-digging tools within 1 foot of the line in all directions. Hydro-excavation is an acceptable alternative to mechanical digging.



Hand-digging tools or hydro-excavation must be used when excavating within 2 feet of any pressurized line! (Within 3 feet in Uinta due to terrain).

- Inspect excavation work sites at the following times:
 - Before work begins each day.
 - Before personnel enter the excavation.
 - When there is a potential for a cave-in.
 - At regular intervals throughout each shift and according to the permit.
 - After every rainstorm or other hazard-increasing occurrence.

What must be done when work is completed in Excavation?

- Backfill excavation site after required work is complete.
- Tamp and level backfill to eliminate safety hazards such as:
 - Changes to the runoff pattern which may cause damage.
 - Excess dirt.
 - Future settling of backfill material.



Bypassing Safety Devices



Bypassing Safety Devices

Obtain authorization before bypassing, disabling or inhibiting a safety protection device or equipment.

Critical Controls

The Critical Controls for Bypassing Safety Devices are:

- **Perform** a thorough risk assessment prior to bypassing, disabling or inhibiting a safety protection device or system.
- **Communicate** all bypasses between shifts/crews.

Risk Assessment and Authorization

Prior to bypassing a safety protection device an authorized person must perform risk assessment that includes the following:

- **Identifying** the affected safety protection devices.
- **Understanding** the impact of interaction with other safety protection devices and on the system as a whole.
- **Mitigating** the associated risks.
- **Completing** any required Management of Change processes.

Authorization level must be based on risk assessment results.

Common Safety Protection Devices

Common safety protection devices include:

- Emergency shutdown systems.
- Fire and gas systems.
- Process controls and alarm systems.
- Relief valves.
- Crane operator aids (LMIs, Anti-two-block).

Bypass Logs and Management Reviews

Bypassing safety protection devices requires:

- A current log for bypassed safety protection devices.
- A routine management review for all bypasses or inhibits.

Communication and Shift Handovers

The communication plan must cover all shift and crew handovers.

Bypassing Safety Devices 68

- What is a Safety Device? 68
- What is a Bypass? 68
- What is a Bypass Permit? 68
- What must be done before a safety system can be bypassed? 68
- Who can authorize a Bypass Permit? 69
- Who can perform the actual Bypass? 69
- How long can safety systems be bypassed? 69
- How is the Bypass communicated to coworkers? 69

Bypassing Safety Devices

Bypassing, disabling, or inhibiting a safety device compromises the effectiveness of the protection design and should only be performed when absolutely necessary. It is important to understand the protections provided by the device and to mitigate risk associated with removing it from service.



A permit must be obtained any time a safety device is bypassed.

What is a Safety Device?

- Any operational device that safely controls the release of pressure, temperature, liquid level, flow, etc. and/or protects the integrity of equipment, preventing catastrophic failure.
- Common safety devices include, but are not limited to: high-level shutdowns, fire and gas detection systems, pressure relief devices (PRD) and crane operator aids.

What is a bypass?

- The process of removing a part of safety system or safety protection device from service. The device is typically bypassed for inspection, testing and/or repair and may be electrical, mechanical or software.



Always consider alternatives to bypassing a safety device, such as performing work during a planned shutdown or turnaround.

What is a Bypass Permit?

- An authorization to allow a bypass of a safety device.
Note: A single permit can be used to approve multiple bypasses. All devices shall be under the control of the approving supervisor and a list of facilities and equipment shall be attached to the Bypass Permit. The requestor and approver should discuss the process for getting approval for placing each device back in service prior to starting the work.

What must be done before a safety system can be bypassed?

- Complete a risk assessment.
- Generate a Bypass Permit and get approval.
- Follow established procedures for bypassing or disabling the safety device/system.
- Complete the Management of Change (MOC) process, if required.
- Notify affected personnel.

Note: A log or register of all bypassed, disabled or inhibited devices must be kept.

Who can authorize a Bypass Permit?

- Bypassing, disabling or inhibiting safety devices must be authorized utilizing the Bypass Permit. The approval level must be commensurate with the risk identified in the risk assessment.

Bypass Approval Levels		
Risk Ranking	Risk Value ¹	Authorization Level ²
I – Low	1 – 4	Supervisor
II – Medium	5 – 10	Superintendent
III – Significant	12 – 16	Manager
IV – High	20 – 25	NOT ALLOWED

Note 1 – Risk Value based on mitigated risk (i.e., with safeguards in place).

Note 2 – Authorization for Low and Medium Risk can be verbal and documented on the permit. Significant Risk requires written (email acceptable) authorization.

Note: Phone approval is acceptable when signature is impractical.

Who can perform the actual Bypass?

- An Authorized Person must perform the Bypass. An Authorized Person is one who is qualified to work on and understands the functions of the safety devices.

How long can safety systems be bypassed?

- The permit duration must be noted on the permit and should be based on the business need and risk assessment.
- There is no maximum duration; however, devices shall be placed back into service as soon as practical.
- The MOC process shall be followed for devices bypassed for extended durations or removed from service permanently.

How is the Bypass communicated to coworkers?

- All bypassed safety devices must be easily identified by operating personnel with flagging, tagging or some other highly visible markings.
- Bypasses that extended beyond normal workday must be recorded in a log. The log shall be kept in the nearest Control Room, Field Office or electronically, as appropriate.



Driving Safety

Driving Safety



Wear your seat belt, obey speed limits and do not use any mobile device while driving.

Critical Controls

The Critical Controls for Driving are:

- **Wear** a seat belt when vehicle is in motion.
- **Do not exceed** the speed limit.
- **Do not use** mobile devices while driving.

Seat Belts

All occupants must wear and keep their seatbelts properly fastened while in a moving vehicle.

Driving Behaviors

Drivers on company business or property must:

- **Observe** speed limits.
- **Drive** to accommodate weather and road conditions.
- **Never** drive when fatigued.
- **Pull** over and take a break when necessary.

Vehicle occupants must intervene if an unsafe situation arises.

Spotters must be utilized when required.

Mobile Devices

Do not use mobile devices while driving. These include:

- Mobile Phones.
- Tablets.
- Laptops.

Mobile devices may be used as navigational aids. Manual activation or manipulation must only be performed when the vehicle is parked.

Journey Management

Perform a pre-trip inspection prior to operating a vehicle.

Complete a Journey Management Risk Assessment when required.

Driving Safety 74

- Company Vehicle 74
- Company-Assigned Vehicle 74
- What do you need before driving a company vehicle? 74
- Is any other training required? 74
- Can I use my assigned company vehicle for personal errands on the trip home from work? 74
- What does a company-assigned vehicle need to be equipped with? 74
- Who can ride in a company vehicle? 75
- Can I use a cell phone while driving? 75
- What are some general safety rules for driving a company vehicle? 76
- Is an in-vehicle monitoring system (IVMS) required? 76
- What happens if you have an incident in a company vehicle? 76
- Are there special requirements for long trips in a company vehicle (Journey Management)? 76

Driving Safety

Company Vehicle – any vehicle authorized for use on roads in the name of COP, including company-owned, leased, rented and van pool vehicles, as well as employees' personal vehicles authorized for use on company business (i.e., the employee is eligible for mileage reimbursement).



Motorcycles are not authorized for use on company business!

Company-Assigned Vehicle – any company-leased or -owned vehicle that is assigned to a driver as its exclusive user.

What do you need before driving a company vehicle?

- Proper driver's license for the motor vehicle and cargo being transported.
- Complete Defensive Driver Training.
Note: Only initial DDT is required.
- Verbal approval from a supervisor before using a personal vehicle to travel on COP company business.
Note: Supervisor approval is not needed for local travel such as airport, business lunch, same area office-to-office, etc.

Is any other training required?

- Each area should hold annual safety meetings to focus on area-specific driving hazards and issues. Drivers who are assigned a company vehicle should attend these meetings.

Can I use my assigned company vehicle for personal errands on the trip home from work?

- Yes, if the stop is within reasonable proximity of the route home.

What does a company-assigned vehicle need to be equipped with?

- First-aid kit.
- Functioning In-Vehicle Monitoring System (IVMS).
- Motor Vehicle Accident Reporting Kit.
- Proof of insurance.
- Fire extinguisher (minimum requirement):
 - A-B-C rating.
 - 20 lbs. for trucks.

- Motor vehicles regulated by DOT must contain the following additional equipment:
 - Three bidirectional, emergency reflective triangles.
 - Spare fuses of each type and size used on the vehicle.
 - Copy of the DOT Emergency Response Guide.

Who can ride in a company vehicle?

- Company employees.
- Non-employees on company business.
- Non-employees during an emergency response.
- Family members being driven on official company business with prior approval from employee's supervisor.

Can I use a cell phone while driving?

- Use of a cell phone, two-way radio or other electronic device is prohibited while:
 - Operating a company vehicle.
 - Operating a personal vehicle on company business.
 - Operating any motor vehicle on company property.
 - Operating a personal vehicle on personal business when mobile device is company property.



Use of a hands-free device does not override any of the restrictions on using mobile devices!



Setup or adjustment of navigational aid is allowed only while the vehicle is safely parked!

Exceptions to using mobile devices while driving include the following:

Imminent risk to:	Communicating with:	When using:
<ul style="list-style-type: none"> • Personal safety • Public safety • Company property 	<ul style="list-style-type: none"> • Emergency personnel • Someone who can report or mitigate risk 	<ul style="list-style-type: none"> • Navigational aid with a hands-free feature through audible speech

What are some general safety rules for driving a company vehicle?

- All applicable motor vehicle laws and regulations must be followed.
- All vehicle occupants must keep their seat belts properly fastened while the vehicle is in motion.
- Smoking in a Company vehicle is prohibited (including e-cigarettes).
- Whenever possible, park so that:
 - Ground contact points of nearby equipment are seen from the driver's seat.
 - The vehicle does not have to be driven in reverse (except for angle parking) when leaving.
 - The vehicle is outside of hazardous areas.
- When leaving a Company vehicle unattended with the engine running, the transmission must be in park and the parking brake set or wheels chocked.
- Vehicles should not be driven inside electrically classified areas without a permit.
- Company vehicles must not contain or transport firearms or weapons unless an exception is made with approval from COP Global Security and management. See the Global Security Policy.

Is an in-vehicle monitoring system (IVMS) required?

- All company-assigned and pool vehicles must have a functioning IVMS installed.
- IVMS may be used to monitor and analyze driver behavior.

What happens if you have an incident in a company vehicle?

- Notify the following personnel immediately:
 - Law enforcement when the incident occurs on a public road, as required by law.
 - Immediate supervisor.
 - Health, Safety and Environment (HSE) representative.
- Complete an incident report promptly and participate in the alcohol/controlled substance screening/test per your supervisor's direction.

Are there special requirements for long trips in a company vehicle?

- A driver who is tired should either pull over to a safe spot and take a nap or check into a hotel to sleep.
- Follow additional requirements detailed in Fatigue Manual.



Process Safety Fundamentals

Process Safety Fundamentals



Process Safety Fundamentals

The Process Safety Fundamentals (PSFs) are simple, actionable and good operating practices meant to improve process safety awareness and create discussions in the field. In many instances, the PSFs can be satisfied completely, but, when they cannot, it's time to stop and have a meaningful discussion between the team, supervisor and support staff to find an alternative safe course of action to complete the work.

Process Safety Fundamentals

Always use two barriers for hydrocarbon vents and drains.

Where are your two line barriers (a valve, plug or blind) on hydrocarbon vents and drains?



Never leave critical draining and transfer operations unattended.

What will you do so as not to leave an open drain or transfer valve unattended?

Know the condition of your safety devices.
Risk-assess any impairments or deferrals.

What are your safety devices? Are they working properly and up-to-date on their inspections? If not, how will you mitigate?



Walk the line. Verify and validate any line-up change.

Have you walked the line to validate proper line-up and connections?

Always follow an approved change management process prior to altering process systems (even if temporary).

Who reviewed and approved the proposed change?

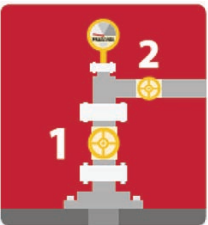


Verify for complete tightness after installation or maintenance work.

Have you checked to make sure all bolts and connections are tight following installation and maintenance work?

Ensure equipment is pressure-free, drained and properly isolated before starting work.

How did you verify there is no stored energy in the equipment and that it is properly isolated before starting work?



Ensure effective well isolation, with at least two barriers, when working downstream of a well.

What barriers will you maintain between you and the well while performing downstream work?

Other HSE Topics

A-H



Abrasive Blasting

Abrasive media is often used for paint removal and surface preparation for certain coating applications. Inhalation of toxic dusts, such as lead from the paint or silica from the blasting media, is a main health hazard associated with this activity.

The following are required to reduce this health hazard:

- Approval from site/area supervision for the specific type of blasting media.
- Assume coatings contain lead until proven otherwise.
- Designate a Competent Person (one who can identify existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate such hazards) before removing any lead or lead-containing materials.
- Wear proper personal protective equipment (PPE) including a breathing apparatus as determined by risk assessment.

Air Compressors and Receivers

- Air compressors in continuous service should be on a regular preventive maintenance schedule that includes draining the receivers weekly to prevent liquid accumulation.
- Infrequently used air compressors and receivers must be drained each time they are used and before they are put in service.
- Use only appropriate lubricants.



Non-approved lubricants may cause fire and/or explosion!

- Air compressors and air receivers must have a pressure relief device. It is also recommended that a block valve be installed between the compressor/receiver and the relief device, but the valve must be car-sealed open except when testing the relief device.
- Relief devices on air compressors must be tested per the Lower 48 ITR-Pressure Relief Devices Manual.
- For vehicle-mounted compressors with air receivers, the pressure must be reduced to less than 25 psig before moving onto public roads.

Asbestos (Respirable Fibers)*

Asbestos is a material frequently used in the past for insulation and other purposes. When disturbed, the dust can become airborne and is hazardous to a person's health if inhaled. Typically, asbestos removal requires the use of specialty contractors with job-specific tools and training. The following precautions are to be employed when dealing with any facility or equipment that is suspected of containing asbestos:

- Leave any questionable material undisturbed and notify immediate supervisor for proper identification.
- Consult supervisor regarding the job requirements prior to disturbing respirable fiber containing material (RFCM) in any manner.
- Consult the Environmental Representative prior to collecting, disposing of, selling or releasing asbestos-contaminated equipment or waste.
- Collect and dispose of any waste, scrap, debris, bags, containers, equipment or clothing contaminated with asbestos material in sealed, labeled, impermeable bags or containers.
- Ensure that labels have been affixed, where feasible, to all installed asbestos products.

Asset & Operating Integrity (A&OI)

The **A&OI** program ensures that minimum company and industry standards, codes, specifications and regulations are met and maintained during project design, construction and ongoing operations.

Asset Integrity is the capability of an asset to contain its contents within the pressure envelope. This is typically verified through testing and inspection.

Operating Integrity is the ability and competency of the workforce to safely operate and maintain an asset.

To accomplish the goals of the A&OI program, we must:

- Follow all requirements of the Lower 48 HSE Management System manuals, guidelines and standard operating procedures.
- Implement the Life Saving Rules and Process Safety Fundamentals.
- Ensure the proper level of oversight and onsite supervision is provided for all jobs.

- Apply the Lower 48 Management of Change (MOC) and Pre-Startup Safety Review manuals to all applicable modifications and changes.
- Maintain an accurate equipment inventory by completing material transfers when equipment is moved.
- Comply with Lower 48 Engineering Specifications and Standards.
- Ensure Lower 48 ITR-required inspections and tests are completed and documented on schedule, including a focus on safety-critical elements.
- Know the most likely loss of containment scenarios with significant or high risk, and the approved measures to prevent them.
- Report unplanned events (leaks, heavy corrosion, dents, gouges, cracks, etc.) to the supervisor.
- Perform routine and formal lease inspections to ensure equipment is in good working order.

ATV (All Terrain), UTV and Snow Vehicles

Prior to unloading and operating an ATV/UTV/snow vehicle, the driver must:

- Perform a JSA to determine the hazards associated with the task (terrain, weather, road conditions, loading/unloading, etc.).
- Wear and use appropriate PPE.
- Ensure the vehicle has a first-aid kit.

All ATV/UTV/snow vehicles drivers must:

- Complete BU-specified ATV, UTV or snow vehicle safety training if required.
- Have a valid driver's license.
- Follow the local Lone Worker procedures and carry a communication device capable of maintaining contact with coworkers.
- Exercise caution when unloading or loading.
- Never refuel while the engine is running.



No passengers can ride on an ATV, UTV or snow vehicle designed for "Driver Only"!

Axiom (Injury) Notification

Axiom contact number: (877) 502-9466

- Axiom is a medical injury case management service to help facilitate proper medical care for workplace injuries.
- Coverage is available 24/7, 365 days a year.
- After reporting an injury to their supervisor, the employee and/or supervisor must call Axiom for a recommendation on appropriate medical attention.

Note: Contractors that have agreements in place with other approved injury case management companies can use those services instead of Axiom at their own expense.

- Axiom will:
 - Discuss the injury with the employee or contractor and provide an initial diagnosis and treatment recommendation.
 - If needed, direct the injured person to an appropriate medical facility and provide preliminary information to the receiving physician.
 - Speak with the examining physician before the injured person leaves the medical facility to understand any ongoing treatment and recovery recommendations.
 - Follow up with the injured person until they return to regular work duties.
 - Provide updates to company leadership during the entire process.



Some injuries will be an emergency and warrant immediate treatment such as calling 911, an ambulance or taking the injured directly to a hospital!

Barricades

There are two types of barricades:

- Warning Barricades.
- Protective Barricades.

Note: When practical, a protective barricade is always preferred.

Warning Barricades:

- Call attention to the hazard but offer no physical protection.
- Are set up when it is not practical to eliminate the hazard completely.
- Draw attention to specific hazards or to restrict entry.
- Warning barricades include:
 - Red and black danger tape.

- Black and yellow caution tape.
- Orange fluorescent tape.
- Traffic cones.
- Double-sided floor stand signs.

Protective Barricades:

- Provide a physical barrier to keep personnel outside the hazardous area.
- Are provided where there are elevation differences of more than 4 feet.
- Examples include:
 - Guardrails, handrails.
 - Interlocking railing system.
 - Fencing material.
- When it isn't feasible to install a protective barricade, other protections should be used (example: use a personal harness and/or fall arrest system when working at heights.)



Personnel should not enter a barricaded area unless they understand the hazards, mitigate those hazards and have an immediate need to be within the barricade!

Benzene*

- Benzene can be found in all areas of oil and gas production operations and is recognized as a carcinogen (may cause cancer).
- Prolonged exposure to benzene above OSHA permissible exposure limit (PEL) can cause adverse health effects.
- Every effort should be made to avoid breathing hydrocarbon vapors:
 - Use respiratory protection for work tasks where hydrocarbons may be present including maintenance, repair, vessel cleaning, remediation of hydrocarbon-contaminated soil and during emergencies.
- Establish and post regulated areas if workplace-permissible exposures are above the COP OEL (8-hour time-weighted average [TWA] of 0.5 ppm, or the short-term exposure limit of 2.5 ppm for 15 minutes).
- Ensure employees exposed above the OEL receive initial training and annual refresher training thereafter.
- Train employees (initial and annual refresher training) with the potential to be exposed above the Operating Exposure Limit (OEL).
- Ensure the employees participate in annual medical surveillance examinations.

Bloodborne Pathogens (BBP) and Other Potentially Infectious Materials (OPIMs)

Bloodborne pathogens and OPIMs may be present in human blood and can cause diseases in humans including the Hepatitis B virus (HBV) and the human immunodeficiency virus (HIV).

- Use universal precautions, including proper PPE (e.g., gloves, face shield and long sleeves) when responding to medical emergencies that pose a potential exposure to BBP.
- Blood cleanup should only be performed by properly trained and equipped personnel.
- Following any exposure or potential exposure to blood or potentially infectious bodily fluid, the hepatitis B virus vaccine and vaccination series as well as HIV/AIDS testing is available at no charge to COP employees. Contact your supervisor and/or Safety & Health if you have questions.

Boomers, Binders and Come-Alongs

- Lever-style load binders (e.g., snap boomers) and non-ratcheting chain come-alongs must not be used on COP Lower 48 locations.
Note: If a third-party delivery company comes to location with snap boomers, they can perform a JSA and use that equipment.
- Handle extensions (i.e., cheaters) must never be used on binding, tensioning or lifting devices
- Cheaters must not be used to release the boomer handle.
If necessary, stand to the side of the handle and use a steel pry bar under the handle.



Always stay out of the line of fire as the handle releases!

Burn Ban Conditions

Burn bans are issued and enforced by government agencies when dry weather conditions increase the risk of wildfires.

During a burn ban, the following are typically prohibited:

- Outdoor fires, including recreational fires.
- Driving vehicles through tall vegetation (i.e., height above top of tire rims).

Note: A fire watch for each activity that may cause a spark (e.g., welding, torch cutting and grinding) and wetting of the area should be required.

- Open flames or ignition sources (including vehicles) within 35 feet of combustion sources particularly when winds are greater than 15 miles per hour.

Note: If unable to clear the perimeter of vegetation for 35 feet:

- Vegetation should be soaked with water.
- A loaded water truck (minimum 350 gallons) should also be on-site.
- Fireproof tarps/blankets should also be considered.

Note: When winds are greater than 15 miles per hour:

- Additional buffer (e.g., 100 feet) should be considered.
- Other alternatives (including delaying hot work or allowing hot work only in designated areas) should also be considered and used whenever possible.

Camlock Connections

When using camlock connections:

- Conduct a pre-use inspection before each connection is made and replace any damaged, missing or broken parts of fittings.



Do not use fittings with missing cam ears!

- Ensure connection points are clean and free of debris.
- Position trucks and hoses to ensure the camlock fitting is not placed in a bind during installation.
- If abnormal force is required to disconnect a camlock fitting, stop the job and evaluate the problem before continuing.



Avoid the Line of Fire — position your body to avoid being struck by the hose end if the connection suddenly releases!

Carbon Dioxide (CO₂) and Nitrogen (N₂)

The following apply to CO₂ or N₂ activities:

- Be trained on the hazards of CO₂ and N₂ and the proper safe handling procedures, including PPE.
- Do not enter closed structures containing CO₂ and/or N₂ without adequate ventilation.



Check for oxygen concentration before entering.

- Use only supplied air respirators or self-contained breathing apparatus in CO₂ or N₂ environments.
- Do not go into low-lying areas or areas without adequate ventilation if CO₂ or N₂ is being vented or leaked.
- Valves used to control the flow of CO₂ or N₂ must be the throttling type to avoid sudden erratic flow.
- Securing methods (e.g., anchors, stakes and cement blocks) for energized fluid lines should be designed by Engineering.
- Do not extend vent lines more than 2 feet beyond the edge of a pit or point vent line down.
- Stand clear of the vent line during circulating or venting operations.
- Secure kill truck (pump truck) lines used with the vent line in the same manner as the vent line.

Compressed Gas Cylinders

- Compressed gas cylinders containing commercial gases, including “empty” cylinders, must always be secured.



Never secure a cylinder with sharp clamps or screws!

- When not in use, cylinder valves must be closed and covered with a cap.
- Store cylinders in the vertical position.
- Stored oxygen cylinders must be separated from fuel gas cylinders by at least 20 feet or by a noncombustible barrier at least 5 feet high.

Note: This does not apply to welding trucks or two-wheeled carts.

- Never connect oxygen to anything that contains, or has contained, hydrocarbons.
- Never apply oil or grease to oxygen cylinders, regulators, gauges or hoses.



All oxygen gauges shall be marked “Use No Oil.”

- Never wear oily gloves when handling oxygen equipment.

Contractor HSE Management*

Contractor HSE Management is based on the principle that contractor and COP employee HSE performance are equally important.

The following apply when using contractors:

- Use only approved contractors (from approved list).
- Follow procurement guidelines when adding contractors to the approved list.
- Critical Activities may require:
 - An HSE plan, pre-mobilization meeting, pre-job walkthrough, on-site hazard analysis, demobilization plan and final evaluation.
- Determine whether to use COP or contractor’s HSE procedures for each job following a review of the contractor’s procedures and programs.
- Contractors must provide regulatory training, HSE orientations and specific job skill training and certification for their employees before arriving on the COP property.
- All contractors must attend a COP Safety Leadership Seminar (SLS).
- During an area-specific briefing, pre-job safety meeting or JSA, provide an overview of COP’s HSE procedures to be used by the contractor.
- A JSA/Go Card discussion is required before performing any work on a COP site.
- Contractors with Significant or High-Risk rankings must be evaluated using the Contractor HSE Management Manual.

Control of Work

All work performed on COP locations shall have an adequate level of oversight by a company representative (employee or contract designee). At no time shall work be performed without the knowledge of at least one COP representative who understands the scope, scale and specific timing of the work.

Work sites must always be supervised by an on-site leader who is accountable for safe and efficient execution of work. This individual may be either a company representative or contractor.

Work Within Operational Control

Assets shall define the level of verification required to effectively manage HSE risk; however, they shall not define additional critical HSE tasks that require company representatives to be on location.

A company representative is required to be on location during tasks specifically identified in the Lower 48 HSE Manuals and the Lower 48 HSE Critical Tasks List.

Robust contractor management practices shall be in place to assure contractors understand and meet COP HSE requirements. These processes include the requirements of the Lower 48 Contractor HSE Manual as well as other activities such as audits, including LSR verifications.

Work Outside Operational Control

Company representatives shall not be permanently on location or directing work that is outside of operational control as defined by the Lower 48 Operational Control Guideline; however, company representatives can be on location to complete assurance and/or activities that are defined prior to the start work.

Drilling and Well Servicing

The following apply to drilling and well-servicing operations:

- Signs posted at the location entrance should indicate:
 - Only Authorized Personnel are allowed.
 - Special hazards such as H₂S, smoking rules, etc.
 - Where to report for HSE orientation.
 - Minimum personal protective equipment (PPE) required.

- Power lines within the fall distance of the derrick must be de-energized while rigging up or down.



Reference the Overhead Powerline section of the handbook for additional requirements

- Guy lines should be flagged to increase visibility and guard against vehicle traffic.
- Use a spotter to help locate equipment near guy lines and power poles.
- Hold periodic drills to ensure personnel are familiar with the site Emergency Response Plan. The following is a recommended schedule:
 - Hold pit and trip drills weekly.
 - Hold H₂S response drills weekly while working on wells with the potential to produce H₂S.
 - Hold Well Control drills per COP's Well Control Manual.

Swabbing:

The following apply to swabbing operations:

- Swabbing at night is discouraged but allowed with appropriate lighting.
- No one is allowed in the derrick or within 6 feet of the wellhead when the swab line is being run in or out of the hole.
- Swab with a lubricator long enough to contain the entire swab assembly and which can be isolated from the tree (with a swab valve), bled down and removed while the well continues to flow.

Wireline Operations:

The following apply to wireline operations:

- Do not weld or burn within 75 feet of the wellhead or wireline unit while the unit is operating and then only in an approved hot work area with continuous wind direction and gas LEL monitoring.
- Pressure control equipment must be used where the potential for surface pressure exists.
- Lubricators must be long enough for the entire tool string to be raised above the surface-controlled shut-in device (wellhead valve, BOP, or lubricator valve) on wells that can flow.

Note: For fishing operations, the fishing string and fish should both fit inside the lubricator.

- A wireline lubricator is not required:
 - While open-hole logging during the drilling phase in overweight mud conditions.
 - When logging inside unperforated casing/liner with kill weight fluid in the well and BOPs installed.

Note: Continuously monitor the well to ensure it does not begin to flow.

- Include a pump-in sub or other suitable access for connecting pumping lines to the lubricator in case a well kill is necessary.
- Secure portable or skid-mounted wireline units to prevent any unwanted movement. If chocked, a minimum of two chocks should be used: one behind each rear wheel on the wellhead side.
- Secure the loose end of a wireline that could recoil when released prior to handling.
- Rope falls (block and tackle), gin poles (telescoping and single post), attachments and attachment devices must be rated to handle the anticipated load.



No one is allowed in the derrick or near the wellhead while running wireline in or out of the hole!

- Logging devices containing radioactive material may only be handled by qualified personnel.

Drug, Alcohol and Other Contraband Policy

The following contraband items are not permitted on COP property at any time.

- Firearms — unless such a ban is prohibited by state law or with prior permission for a special event, e.g., approved hunting, raffle, gift, etc.
- Note:** On-duty law enforcement personnel exempted.
- Ammunition.
- Incendiary devices, accelerants, gunpowder or hoax bombs.
- Machetes — unless approved by local BU management and applicable to work scope.
- Illegal knives (per applicable state law).
- Unauthorized alcoholic beverages

Note: Authorized alcoholic beverages must be pre-approved by a senior manager responsible for the site.

- Illegal drugs or controlled dangerous substances.
- Drug paraphernalia which in the judgment of the company is used exclusively for illegal drug ingestion, inhalation or consumption.
- Prescription medications without proper prescription.
- Pornographic, obscene, defamatory, abusive or inflammatory material or literature.

- Smoking or vaping (e-cigarettes) may only be done in dedicated smoking areas. Do not carry smoking paraphernalia, including: lighters, matches, e-cigarettes or their batteries in work areas. These should be stored at the dedicated smoking area.

COP will conduct drug and alcohol screening for all employees including:

- Preemployment (drug).
- Random (drug and alcohol).
- Reasonable suspicion (drug and alcohol).
- Post-accident (drug and alcohol).
- Post-rehabilitation (drug and alcohol).
- Aftercare (drug and alcohol).

Electrical Safety*

Qualified Person — a COP or contractor employee who:

- Has received training on COP procedures.
- Has also received electrical training.
- Can safely work on energized circuits.
- Is familiar with the use of electrical-specific precautionary techniques, PPE, insulating and shielding materials and insulated tools.
- Can recognize and avoid the electrical hazards that may be present with respect to that equipment or work task.

The following rules pertain to Electrical Safety:



Only a qualified person can work on electrical/electronic equipment and installations.

- Make sure all electrical/electronic tools are rated for potentially flammable or combustible atmospheres (hazardous classification Division 1 or 2).
- Inspect these tools routinely and remove them from service when they are in disrepair and can no longer meet approved standards.
- Use a combustible gas detector to prove (and periodically retest) that no flammable atmosphere exists before and while using these electrical and electronic tools in classified areas.

- JSAs need to include:
 - An assessment of electrical hazards and methods to eliminate, minimize or control those hazards.
 - Required PPE to mitigate electric shock and arc flash hazards.
- Control the generation and accumulation of static electricity buildup to eliminate spark hazards.

Note: Hydrocarbon liquids can accumulate a static charge during any kind of movement such as pumping, pouring, moving through pipes, filtering and mixing.
- Portable containers used to collect hydrocarbon liquid must be metallic.
- Absence of voltage must be verified before initiating any activity.
- Test instruments must be suitable for the expected voltage level and CAT IV rated for overvoltage protection.
- Electrical work (especially outdoor work) must be postponed when an electrical storm is near enough to be seen or heard.
- Metal ladders must not be used by workers doing electrical work.
- Do not work alone (away from immediate assistance) when working on energized circuits above 600 V.
- Personnel must use LOTO when working on or near de-energized parts or equipment that may suddenly reenergize or restart.

Filling Portable Containers

- Containers must be metallic.
- All conductive couplings (e.g., end fittings) and components must be bonded and grounded as a minimum when using a nonconductive hose.
- Hoses used immediately downstream of filters in nonconductive liquid service must be made of metal or other conductive material.
- Follow these steps to fill portable containers:
 1. Connect electrically the container to the fill pipe.
 2. **IF** solid connection between container and fill pipe does not exist **THEN** connect a flexible bonding jumper between container and fill pipe to return accumulated charges from liquid back to fill pipe.
 3. Place nonconductive sample bottles inside a grounded metal cage when used.
 4. Place container on material that is electrically connected to earth.



Cement has sufficient conductivity to bleed a static charge to safe levels but rubber (e.g., tires), glass, plastic and ceramics do not.

Filling Metal Storage Tanks

- Fill pipe must be metallic and electrically connected to the tank.



Metallic storage tanks are considered to be inherently grounded for dissipation of electrostatic charges as long as they are not on the liner (see API RP 2003 Para 4.5.3).

- The down-comer must meet one of the following:
 - Terminates no more than six inches from the bottom of the tank if the storage tank contains either:
 - Hydrocarbon low-conductivity fluids.
 - Vapor space with potential to contain a flammable mixture.
- Has been exempted and documented based on Engineering analysis in accordance with **Electrical Safety Manual Appendix B — Engineering Analysis for Down-comer — exemption determination.**



Do not use siphon breakers (API RP 2003 Para 4.5.2a), Occupational Safety and Health Administration (OSHA) 1910.106(b)(2)(viii)(e).

The fill line discharge velocity of the incoming liquid stream must be limited to 3 ft/sec (0.91 m/sec) until the downcomer is submerged by two pipe diameters.



In cases where water droplets may be entrained in the liquid, limit this flow rate to 1 ft/sec (0.30 m/sec).



Equipment shall be purged of air prior to introduction of flammable/combustible fluids to prevent explosive atmosphere.

Follow these steps to fill metal storage tanks.

- Ensure fill pipe is metallic.
- Connect electrically the container to the fill pipe.
- **IF** solid connection between container and fill pipe does not exist **THEN** connect a flexible bonding jumper between tank and fill pipe placing the bonding jumpers around any joint that is made of an insulating material.



Bonding jumpers are not required to be placed around flexible or swing joints (NFPA [2007 edition], Para 10.1.2).

Filling Non-conductive Storage Tanks (Fiberglass, Plastic and Lined)

- Protective measures must be taken against static electricity hazards for fiberglass storage tanks (API 12P, Chapters 4.17 and 4.18).



Gasoline engine nonconductive fuel tanks under 5 gallons are an exception and do not have to meet the following requirements (NFPA 77 [2007 Edition], Para 11.1.7).

- All conductive components must be bonded together and grounded including:
 - Thief hatch.
 - Metal rim.
 - Metallic walkway, stairway or ladder attached to a tank (API RP 2003 Para 4.17).
- Interior fluid must be high-conductivity liquid.
- Interior fluid must be grounded by one of the following methods:
 - Conductive down-comers.
 - Conductive internal ground rods.
 - Cable for bottom loading tanks.
 - Static dissipater — approved by NRTL (Nationally Recognized Test Laboratory) or COP Engineer that is designed for purpose.
 - Carbon C-veil (API 12P 4.17, API RP 2003 Para 4.5.9.1c).
- Conductive methods described above must be submerged in fluid at all times.

Truck Loading Through Open Dome

- A bonding jumper must connect the cargo tank to piping and earth before the dome of the truck is opened and must remain connected until the dome is closed.
- A bonding jumper must be connected between the fill pipe and the other side of the insulating material when the fill pipe is attached to insulating materials (e.g., rubber hose or insulating joint).
- Tank trucks shall be bonded to the storage tank before the transfer line is connected.
- The transfer line shall be disconnected before the bonding jumper is disconnected.

Emergency Response*

Initial Response Safety Precautions:

- Resist rushing in!
- Protect yourself and others.
- Observe from a distance.
- Identify hazards.
- If appropriate, approach cautiously from upwind, uphill or upstream.
- If able, safely secure the scene.
- Obtain help.

Emergency Response Plan

- Emergency Response Plans are maintained at each BU/Asset or field office to identify potential emergency situations and provide a plan for appropriate mitigation and control.
- Personnel should understand their roles and responsibilities (if any) in their local emergency response plan, especially the limitations on actions they may take in response to an incident and the level of HAZWOPER Training they are required to have:
 - Awareness Level — personnel who might discover a hazardous material spill or release. Their actions are limited. May initiate shutdown procedures if it is safe and they are trained to do so.
Cannot perform defensive or offensive actions.
 - Operations Level — personnel who may respond to a hazardous spill or release in a defensive manner only, such as containing the spill and/or protecting people and the environment.
 - Technician Level — personnel trained to respond to a hazardous spill or release in an offensive manner and take steps to stop the release and clean it up.
- While on-site, all personnel should continuously monitor conditions such as the location of hazards, wind direction, exit and muster points and the location of the nearest medical facility.

Environmental*

Spill Response and Reporting*

Follow these steps when a spill is discovered:

- Attempt to determine the source of the spill and stop it if it can be done safely.
- Immediately notify the responsible COP Supervisor and BU Environmental Staff of the spill.

- Contain the spill to minimize the impacted area, if safe to do so.
- Secure and preserve all incident evidence.
- Participate in the Corrective Action Plan.

Spill Prevention Control and Countermeasure (SPCC)*

Some facilities are required to have an SPCC Plan to prevent an accidental discharge of oil into navigable waters or adjoining shorelines.

Operations personnel should:

- Notify BU Environmental Staff of any new facilities or planned facility modifications for SPCC applicability determinations and new or updated SPCC Plans.
- Know which sites have SPCC plans.
- Understand and implement spill prevention, control and countermeasure practices as detailed in SPCC plans.

Air Emissions*

Notify BU Environmental staff:

- In the early stages of planning and prior to initiating construction of new facilities or modification or removal of existing facilities.
- Prior to modifying emissions sources.
- When operating conditions change at a facility.
- Prior to new construction or modifying facilities:
- Design equipment and facilities to minimize emissions:
 - Hold an Environmental review as part of the Management of Change (MOC) process.
Note: Modifications include increases in throughput.
 - Start facility construction only after receiving all required state/federal/local authorization or permits applicable to the work.
- Operations personnel are responsible for:
 - Understanding permit limits, monitoring, documentation, emission testing, reporting and recordkeeping per permit conditions or other regulatory requirements.
 - Maintaining pollution control equipment (vapor recovery units, combustors, flares, thief hatches and catalytic systems).
 - Maintaining mechanical equipment (seals on packing glands, flanges and connections) to minimize emissions.
 - Knowing which facilities have air permits and registrations and their requirements.
 - Managing and tracking compliance actions to comply with permit conditions or other applicable requirements.
 - Accurately recording monitoring data in accordance with required schedules.
 - Operating equipment and facilities to minimize emissions.
 - Use applicable technology to monitor emissions.

- Open burning, including fire training, generally requires regulatory authorization.
Note: Open burning should be used as an option only after discussion with your HSE representative and after required authorizations are secured.
- Flaring and venting should be minimized and according to regulatory requirements.
- Emergency flaring, venting and accidental releases must be reported to an HSE representative immediately, be closely monitored and quantified to the best extent possible.

Superfund Amendments and Reauthorization Act (SARA) Title III*

Laws enacted under SARA Title III are designed to provide state and local governments and citizens with information to plan for emergencies. It requires employers to provide information on chemical hazards to local and state government authorities.

- Use the process described in the Hazard Communication Manual to control and report chemicals that are brought to a facility or location.

Storm Water*

- A storm water release from a site may trigger a permit requirement (Industrial Storm Water Permit if the discharge exceeds a reportable quantity or violates a water quality standard).
- An Industrial Storm Water Permit is required when a storm water discharge includes a reportable quantity of oil or causes an oil sheen for which notification is required.

Contact BU Environmental prior to completing any storm water discharges. Contact BU Regulatory to determine storm water permitting requirements for construction activities.

- Certain facilities with Storm Water Permits may require specific mitigations and reclamation.
- Contact BU Regulatory or Environmental staff for storm water guidance.

Waste Management*

All waste must be properly classified, stored, labeled and disposed of per COP policies and government regulations.

- Consult with your supervisor and BU Environmental resource for approved waste management practices and before generating a new waste stream. BU Environmental must approve any new waste disposal practice.
- Personnel handling hazardous waste must be properly trained.
- Consult with BU Environmental regarding storage hold times, testing, labeling, transportation and disposal.

- Wastes must be disposed at approved disposal sites.
Minimize waste generation by managing activities, recycling and using nonhazardous alternatives where possible.
- Do not mix waste streams. Even small amounts of hazardous waste mixed with other wastes can result in the whole waste stream being classified as hazardous, thus making disposal more expensive.
- Eliminate or reduce the quantity of waste at the source.
- Reuse, reclaim or recycle as much of the waste as possible.
- Use an approved contractor/facility to reprocess, recover and use waste as fuel.

Waste can only be disposed of at a COP Waste Management program-approved hazardous, industrial and recycler waste sites or approved E&P exempt waste disposal site.

Ergonomics

Ergonomics is the study of how people use their bodies to do work and designing the workplace environment to prevent injuries and illnesses while improving worker effectiveness and comfort. The Lower 48 utilizes the REFS Ergonomics Program. Information on conducting self-assessments, or to request an ergonomic evaluation can be found on the REFS Ergonomics website.

Controllable risk factors in the workplace include:

- Repetitive motions.
- Forceful exertions.
- Awkward or uncomfortable posture.
- Static posture.
- Mechanical stress.
- Environmental factors (temperatures, vibration, lighting and noise).

Early reporting of ergonomic issues is extremely important to ensure an employee's supervisor is informed and can promptly respond to an employee's need.

Those who frequently work at a computer or other repetitive-motion workstations should complete an ergonomic self-assessment form when beginning their assignments.

Extracting Stuck Vehicles

Consider the following when using tow ropes to extract a stuck vehicle:

- Vehicle Attachment:
 - The rope or strap should be connected to a device directly attached to the frame and positioned so the rope or strap won't be cut by sharp edges.

- Tow hooks should be rated for at least 10,000 pounds.
- Hook vehicles back-to-back when possible.



No chains are to be used!

- Tow Ropes or Straps:
 - Should have a minimum breaking strength of 10,000 pounds.
 - Should have a 6- to 8-inch diameter loop braided on each end.
 - Overall length of at least 25 feet.
 - Should be properly stored away from direct sun and weather and inspected before each use.
 - Should be attached by loop or 3/4-inch shackle (rated for 10,000+ pounds) through a totally enclosed hole.
 - Ropes should only be lengthened by “looping” ropes through one another.
 - Take the slack out of the rope or strap before the first pull.

Fatigue Management*

The following pertains to Fatigue Management:

- Time off is to allow personnel the opportunity to obtain at least 6 hours (ideally 7-9 hours) of sleep.
- Commute time is to be incorporated within the scheduled time off. Ensure enough time is allowed so there is opportunity for proper rest.
- Employees are required to attend work unimpaired by lack of sleep and fit for work considering lifestyle and medical factors that could influence fatigue and managing those appropriately.
- Personnel shall not work more than 18 consecutive hours except in emergencies.
- Those called out to attend to business on-site or receive work-related phone calls that interrupt their rest period, especially at night, should not be required to commence duties at the normal time but rather given time to rest (i.e., delay the commencement time of work).
- It is the worker's responsibility to talk to their supervisor when they are feeling fatigued or anticipate exceeding their normal scheduled parameters. (**Normal Schedule Parameter** table below).

Formal risk assessments are required with approval from supervisor or delegate before (also see the Extension Limitations and Approval Process table below):

- Working greater than 16 consecutive hours with a max of 18 hours.
- Extending work sets beyond the maximum normal scheduled parameter.

- Onshore Commuter: >21 days w/max of 28 days.
- Remote Operations: >28 days w/max of 35 days.
- Change in shift rotation that cannot meet the following rest requirements:
 - Days to night: 36-hours rest.
 - Nights to days: 48-hours rest.
- When fatigue symptoms are reported or observed.
- High risk periods of fatigue may occur:
 - First night on shift.
 - During night shift — particularly 01:00 to 05:00 and continuous, long-duration night shifts.
 - During extended work hours (e.g., overtime, callouts, etc.).
 - During extreme weather conditions.
 - Extended periods of high level of physical activity.
 - When an individual has obtained less than 6 hours sleep in 24 hours or has been awake for longer than 18 hours.
 - When an individual is exhibiting moderate or high-level symptoms of fatigue.

During these periods, safety critical tasks should be avoided when possible. Where unavoidable, appropriate management strategies should be agreed upon and implemented. These may include generic strategies to counteract the effects of fatigue, or task-specific strategies.

Normal Schedule Parameters

Parameter	Limitation
Maximum shifts in work sets	Onshore Commuter: 28 shifts Onshore Remote: 35 shifts
Maximum work hours in a 24-hour period	18 hours
Minimum time off between shifts	8 hours
Maximum number of extended shifts per work set	
a) 14 or less hours worked	No limit
b) Greater than 14 hours	Each >14-hour shift must be separated by a minimum of one ≤14-hour shift.

Extension Limitations

Parameter	Limitation
Work hours in a 24-hour period	12 hours ¹
Minimum time off between shifts	12 hours ²
Number of shifts (Day or Night)	
a) Onshore Commuters	21 shifts
b) Onshore Remote Operations	28 shifts
Time off after a work set	
a) Less than or equal to 14 consecutive shifts	36 hours minimum unless work set was ≥84 hours worked then 48 hours minimum
b) More than 14 consecutive shifts	4 days minimum

¹ In practice, an additional half hour is allowed for handover

² Commute is included in the 12 hours.

Extension Approval Process

Extensions	Approval process
When working additional hours and the total amount of hours worked does not exceed 16 hours	1. VERBAL APPROVAL received from supervisor.
When working additional hours and the total amount of hours worked is greater than 16 hours, not to exceed 18 hours	1. COMPLETE a documented risk assessment (See Fatigue Manual) 2. APPROVAL from employee's immediate supervisor or supervisor delegate
Extending a work set beyond: <ul style="list-style-type: none"> • 21 days for onshore commuters • 28 days for onshore remote personnel 	1. COMPLETE a documented risk assessment (See Fatigue Manual) per extended work set. 2. APPROVAL from employee's immediate supervisor or supervisor delegate

Fire Protection

Prevention is our first line of defense:

- Good housekeeping prevents combustibles from contributing to a fire.
 - Areas within 15 feet of production equipment must be free of weeds, grass and other combustibles.
- Smoking is restricted to areas at least 75 feet from any vessel that contains flammable or combustible material.
- All electrical installations must conform to:
 - Area classifications (e.g., Class 1, Div.1 or Div. 2).
 - National Fire Protection Association (NFPA) 70.
 - American Petroleum Institute (API) RP 500.

- Use only UL-approved metal safety cans to store and transport flammable liquids and oily rags. Oily rags should be properly disposed of as soon as practicable.
- Fire detection devices must be installed in control rooms, offices and personnel quarters.
- Each building or hazardous area must have at least two means of egress, with the following exceptions:
 - Space does not exceed 200 square feet.
 - Space is occupied by a maximum of two people.
 - Distance to the exit is less than 25 feet.
- A written emergency evacuation plan must be developed for office buildings with 10 or more people.

Fire Extinguishing

In case of fire:

- Sound the alarm and evacuate the site.
- If possible, shut off the fuel source (remotely).
- Call out a professional firefighting organization.
- Attempt to extinguish only if all the following apply:
 - The fire is small and just beginning.
 - You are trained in the use and limitations of available fire extinguishers (annually).
 - Extinguishing the fire does not expose you to a significant hazard.

Fire Safety Equipment

- Fire safety equipment, other than for fire brigades, is provided to employees ONLY as personal protection.



COP employees and contractors are NOT expected to fight fires except when they are part of an official fire brigade that is equipped and trained!

- Company-assigned vehicles should be equipped with 20-pound minimum (for trucks), multi-purpose, dry-chemical fire extinguisher.
Note: This does not include pool vehicles provided only for office personnel use.
- Fire extinguishers should be mounted to avoid external corrosion of the extinguisher.
- Apply the following to determine the proper fire protection requirements at a site:
 - The site is remote and normally unoccupied — a fire extinguisher in a vehicle is adequate.

- The site is remote and normally occupied or not remote
 - a Risk Assessment and Fire Protection Plan is needed to determine adequate protection.
- If firefighting equipment is provided to personnel, annual training is required.
- Fire extinguishers must be inspected monthly to verify:
 - The extinguisher is charged.
 - There is no evidence of damage or tampering.
 - A monthly inspection tag is present.

Note: Visual inspections must be documented on a tag attached to the extinguisher.
- Fire extinguishers must be inventoried, and annual maintenance performed by a trained person with a UL-approved apparatus.
- Annual fire extinguisher inventory and maintenance must be documented.
- Portable FEs must be hydrostatically tested at prescribed intervals.
- Following maintenance, durable tags must be securely attached to each FE that include a record of maintenance performed, signature of person performing maintenance, and recharge date.
- All inspection and testing records must be kept until disposition of the equipment plus five years.

First-Aid Kits

Office, company vehicles and personal first-aid kits must:

- Include contents and other emergency first-aid equipment based on the job site hazards.
- Meet the current requirements of ISEA Z308.1/ANSI Z308.1 for Type III kits.
- Be readily accessible where provided with the contents inspected regularly and kept up to date.
- Be in all company vehicles.

Flagging and Tagging

Flagging is used in conjunction with tags to increase attention where the tags are not easily visible. Flagging should be one of the following:

- Highly visible neon-colored marking or surveying tape.
- Orange or yellow **DANGER** or **CAUTION** tape.

Tagging is a visual communication tool to:

- Provide messages or instructions prior to starting equipment.
- Make people aware of temporary operational hazards.
- Tell people not to use the equipment.
- Highlight operational hazards not requiring Lockout/Tagout, including work under the LOTO exception process.
- Identify equipment that is in a non-normal position (valves, switches, etc.) during Non-Energy Isolation (Non-LOTO & Try) situations.



Flagging and Tagging is never allowed as a substitute for Lockout/Tagout!

Tagging looks like:

- Tagging is normally orange (Operational/Warning) or yellow (Caution) tags with black letters:



- These tags may be used interchangeably, however, orange tags are typically used to mark out-of-service equipment and yellow tags are used to mark hazards.
- Operational Tags should provide the following information:
 - Equipment that has been altered or placed in a non-normal position.
 - Date the tag was attached.
 - Why the tag was attached.
 - Who attached the tag.
 - Contact information for person attaching the tag.

Other Tagging Considerations:

- Tags should be able to withstand the environmental conditions in which they are placed.
- Tags left in place for an extended amount of time should be checked periodically to make sure the information written on the tag is still easy to read and the flagging is still visible.

- Tags should be secured to devices in such a way they cannot be detached or removed by wind or other weather elements. Zip ties or tie wire are good connectors.
- When the equipment is placed back in service, all flags and tags should be removed.

Removing an Operational Tag:

- Verify equipment is ready to be put back into service.
- Report any areas of concern before operating it.
- Remove tags prior to placing the equipment back in service.
- A supervisor must consent for tag removal if the person who installed the tag is unavailable.

Using a Lock with an Operational Tag:

- Operational locks are not required but may be used with operational tags if the locks are non-colored.



Red, yellow and blue locks are used strictly for Lockout/Tagout & Try!

Grinders and Wire Brush Wheels

The following rules apply to bench, stand grinders and portable grinders and wire wheels:

- The grinder operator must wear a face shield **and** safety glasses with side shields or goggles.
- Other people in the vicinity of grinding work must wear safety glasses with side shields or goggles.
- Disconnect the energy sources before removing or replacing the grinding wheel.
- Guard the grinder and brush wheels as follows:
 - Wheels over 2 inches in diameter must be guarded.
 - At least half of the wheel should be guarded.
 - Guard the side of the wheel facing the operator.
 - The guard should be adjustable so that the grinder can be used in any position.
- Adjust the guard so that:
 - The opening between the tongue guard and chip wheel does not exceed 1/4 inch.
 - An opening of no more than 1/8 inch exists between the work rest (tool rest) and the wheel.

- With the tool unplugged, turn the wheel by hand and inspect it for defects, gouges and cracks. Ensure it is tightly secured on the shaft.
- Do not operate a grinder or wire wheel if the guard is missing or defective or the wheel is loose (vibration).
- Verify the rated wheel speed is greater or equal to the tool's speed and the correct wheel size is used.
- Never use a grinding wheel to grind soft metals such as aluminum or brass.
- Inspect all guards, electrical connections and cords before every use.
- Ensure loose clothing is tucked in or taped. Never allow a rotating wheel to contact the body or clothing.
- Hold the grinder firmly with the wheel against a solid object until the wheel stops when you finish grinding.
- Pneumatic grinders may only be powered by an air source.



Natural gas must not be used to drive any pneumatic tool!



Using a portable grinder in a restricted area is prohibited without an approved Hot Work Permit!

Grounding and Bonding

- Grounding (or bonding) is required to properly ground electrical equipment and associated production facilities and provides protection against lightning and static electricity buildup.
- Prior to transferring liquid (oil, water or chemicals) from one container to another or to/from a truck transport, attach a bonding cable between the two containers to prevent static electricity buildup.
- A qualified Engineer will be utilized to design and a qualified Electrician to install and/or verify the proper installation of electrical grounding on all permanent and temporary facilities.

Hammer Unions

Follow these hammer union practices to prevent serious injury, death and/or property damage:



Never strike, tighten or loosen pressurized unions, lines or connections!

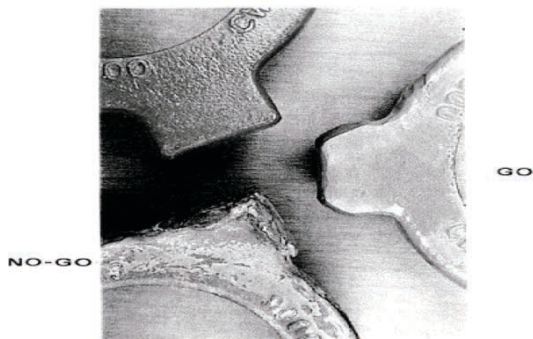
- Always follow the manufacturer's recommended installation, usage, maintenance and inspection requirements.
- Verify zero pressure before breaking connections.
- Ensure all hammer union components are of the same pressure rating (i.e., 1502 with 1502).



Hammer union components that cannot be positively identified as to their manufacturer, size, figure number, pressure rating or approved type of service must never be used!

- Never exceed the rated working pressure of the unions and their attachments.
- Never use severely worn, eroded or corroded pipe or unions.
- Secure unions from falling when using them in overhead applications.
- Secure unions and attachments from undue movement especially when used with pressure control equipment.
- Always inspect, clean and lubricate unions before using.
- Never use hammer unions with sharp edges, burrs, flared wing nut lugs, chips, cuts, cracks or other blemishes.
 - Acceptable Use or **GO** — A minimum of $\frac{1}{4}$ " of flat surface remaining on top of the striking lug after grinding off flared areas.
 - Unacceptable Use or **NO-GO** — Less than $\frac{1}{4}$ " of flat surface remaining on top of the striking lug after grinding off flared areas.

Note: Protrusion or flaring of the lug past the shoulder of the wing nut and other deformities must be ground off flush with shoulder.



- Replace both halves of the union to ensure compatibility of the union when a replacement is required.
- If unions are designed to be used with seals, always use clean undamaged seals and O-rings. Grooves and seal pockets must be clean, rust-free and unblemished.
- Always wear suitable eye protection with side shields when hammering union nuts to tighten.
- Use a 6 lb. hammer on 3" connections or larger and a 4 lb. hammer on 2" connections or smaller.



The use of excessive hammer forces or over-tightening can damage hammer unions and must be avoided!

Handle Extensions (cheaters)

The use of handle extensions is restricted and requires extra precautions:

- Must never be used on binding, tensioning or lifting devices.
- May be used on forged steel wrenches only where other options are not practical and the potential hazards have been identified and thoroughly discussed including precautions taken to eliminate unnecessary personnel exposure.

If a handle extension is to be used, discuss it in the JSA, and apply the following guidelines:

- The maximum length of the extension must be no more than two times the length of the tool handle.
- The handle extension must be made of steel or heavy-wall aluminum pipe.
- The handle extension must fit snugly on the tool handle and cover the full length of the tool handle.

- The force exerted on the handle extension must not exceed the force that can be exerted by one person with both feet firmly on the ground.



Do not put full weight on the handle extension and “bounce” or jerk; do not allow two people on the handle extension!

- Equipment or tasks requiring repeated use of handle extensions should be evaluated for replacement or re-engineering.

Hand Tools

- Identify the line of fire and verify no one is in the strike zone (e.g., pinch points or knuckle busters).
 - Heavy-duty pneumatic hammer wrenches or hydraulic bolt torquing units may be the best option for bolt tightening or loosening.
 - A special-purpose compound leverage wrench (or multiple workers, each with their own wrench) may be the best option for breaking out threaded piping unions.
- Position and brace yourself when applying force to avoid injury if the tool slips or a connection breaks.
- Do not yank stuck pieces of equipment toward you; use pry bars or mechanical tuggers.
- Do not stand on or put full body weight on a tool and bounce or jerk.
- Do not use defective or improper tools.
- Check frequently to ensure hand tools are maintained in good condition to avoid tool slippage.



Defective tools shall be discarded and replaced.

- Avoid repetitive or sustained exertions, particularly if they are accompanied by deviations from straight wrist and/or by forceful exertions. The force exerted should not exceed the force that can be exerted by one person with both feet firmly on the ground.



Do not use too much force on a tool. Use a bigger wrench or handle extension to reduce the force required!

- Secure the work piece when tightening fittings or breaking connections:
 - Do not hold the work piece with one hand and the tool with the other.
 - If relying on the work piece's weight to prevent it from moving, carefully test whether the work piece is heavy enough to stay put with the wrenching force.
- When using an adjustable wrench (e.g., crescent) or pipe wrench, apply the wrench so the force is against the fixed portion of the tool, not the adjustable part.
- Equipment or tasks requiring repeated use of excessive force should be evaluated for replacement or reengineering.
- Train workers on safe hand tool working practices:
 - Inspect tools prior to use.
 - Do not modify the design of a tool.
 - Wear the proper PPE for the job. The JSA should help identify the proper glove for the job.
 - Secure tools when working at heights.
 - Clean and store tools at the end of the job.
 - Do not carry a tool by the cord or hose.



Never yank the electrical cord or hose to disconnect!

- Do not hold fingers on the switch button while carrying a plugged-in tool.
- Keep good footing and maintain your balance when operating tools.
- Pneumatic power tools should be used in electrically classified areas.



The use of natural gas or other flammable substance to power any pneumatic tool is strictly forbidden!

- The driving faces of hammers, chisels, drift pins, bars or similar tools should be free of mushroom heads, breaks and other defects.



Do not use a hammer with a hardened face on a tempered tool such as a drill, file, die or jib!

- Wooden handles must be sound and securely wedged or fastened to the tool.
- Metal handles on digging tools should be avoided when working near electrical hazards.

Holding a Backup Against Powered Torquing

Shut down the job and hold a dedicated JSA to identify and mitigate the hazards associated with powered torquing and holding a backup.

Consider the selection of tools and determine if a reasonable safer alternative exists. If so, that alternative must be used, even if the job must be suspended while the right tools are obtained.

Backup tools must be restrained by mechanical means to prevent them from spinning during powered torquing. Restrain the work piece such that the backup force cannot move the work piece laterally.

Note: Backup requirements do not refer to approved operations where connections are being made using two sets of tongs or a top drive and a set of tongs. However, before tripping pipe, making connections at the stump or making connections at the mouse hole, a JSA/Go Card discussion should be performed to identify hazards and manage risk to an acceptable level.

Hazardous Communication (HazCom)*

The purpose of HazCom is to ensure the hazards and precautions of all chemicals produced at or brought to the work site are evaluated and communicated through container labeling, signs, safety data sheets (SDS) and employee training.

- A Chemical Approval and Inventory Control Form must be completed and approved prior to bringing any new chemicals (except consumer product chemicals) to the workplace.
- An inventory of hazardous chemicals used or stored at each facility will be maintained.
- An SDS for each chemical identified on the chemical inventory list will be readily accessible to all personnel during each work shift.

HAZCOM Labeling

Portable Containers

- Ensure that suppliers' portable containers have the original label as applied by the manufacturer.
- Portable containers used only for temporary and immediate use by the individual who filled it do not require warning labels, however they must be marked with the product name.
- Label any temporary portable containers used beyond a work shift with the quantity (other than a residue) of the material and the same information as the original container's label.

Stationary Storage Tanks

- Stationary storage tanks must be labeled. Ensure Global Harmonized System (GHS) labels are on stationary storage tanks (or posted at the facility entrance) that are capable of being loaded and unloaded by personnel.

Employee/Contractor Communication

- Ensure hazard communication training is presented to employees or contractors who may encounter hazardous chemicals while working on a COP location.

Hearing Conservation*

Workers must be protected from exposure to occupational noise levels that might cause hearing loss. Appropriate hearing protection should be worn in all posted areas and in unposted areas where the potential for temporary high noise levels exists.

HSE will conduct a sound level study (survey):

- At all facilities where excessive noise levels may be present.
- Within 90 days of startup of all machines and facilities.
- When there is a change in the process or equipment.
HSE will designate a site as "noise hazard area" where noise levels typically equal or exceed 82 dBA:
 - Warning signs will be posted in noise hazard areas.
 - Personnel must wear hearing protection devices (HPDs) when working in noise hazard areas regardless of the amount of time in the area.
 - Personnel are to be provided a variety of HPDs and be trained in their use and care.
 - HSE will ensure annual audiometric testing is conducted for all employees when full shift noise exposure equals or exceeds 82 dBA.

Areas where noise levels are equal to or exceed 105 dBA must be designated and posted as “double hearing protection areas” (e.g., earplugs plus earmuffs).

The preferred methods for controlling noise levels are as follows (in priority order):

- Engineering controls (walls, barriers and insulation).
- Administrative controls (procedures).
- PPE.

Hot Oil/Watering

Hot oiling/watering is done to remove paraffin buildup and involves pumping heated oil or water under pressure down a well or through process piping. The following precautions should be followed:

- Perform a JSA/Go Card discussion before work begins.
- Verify that communications equipment is available and working.
- Ensure that:
 - A wind direction indicator (sock) is visible throughout the job.
 - The hot oil unit is not parked under power lines or over the flowline being treated.
 - The wheels on at least one axle of the unit are blocked with chocks in both the forward and backward direction.
 - The unit is placed upwind at least 75 feet from tanks, wellheads and other production equipment.
 - All on-site personnel are informed of the lines to be treated.
 - Fire extinguishers are readily accessible.
 - The unit is grounded to the wellhead or ground rod.
 - Only appropriately rated and designed hoses are utilized. (Restraints/whip-checks must be installed at all hose connections.)
 - Chicksan are used to bring the lines down to ground level to alleviate stress on wellhead connections.
 - An appropriately sized and rated check valve is installed close to the wellhead.
 - The area is free of hazards (e.g., H₂S, gas leaks and spills).
- A pre-job meeting must identify the maximum allowable working pressure (MAWP) and temperature of treating lines and equipment.
- Lines and equipment must be tested to 1-1/2 times the maximum planned treating pressure.
- The operator must always remain at or near the unit’s controls while the job is being pumped.

Hot Work* (including Hot Tapping, Hot Tie-In and in-service Welding)

Hot work is defined as using tools or equipment that may create an arc, spark or open flame (e.g., electric or gas welding, cutting, brazing, burning, grinding, use of an oxyacetylene torch or similar operations).

Authorized Permit Writer — an individual who is trained and approved to authorize/complete Hot Work Permits.

Fire Watch — one or more individuals who are specifically stationed where hot work is being performed and whose only job is to monitor for the presence of accidental fire or other hazardous conditions.



A Fire Watch can perform other safety- related tasks such as atmospheric monitoring or CSE standby person provided their Fire Watch duties are not compromised!

Designated safe work areas — unclassified areas that are more than 75 feet from any wellhead, production piping, vessels or related hydrocarbon-containing equipment and upwind of vents or other sources of hydrocarbon vapors.

Types of Hot Work:

- **Class A** — High Energy Hot Work
 - Welding, cutting, grinding, brazing (open flame) within 75 feet of recognized or potential hydrocarbon sources.
- **Class B** — Low Energy Hot Work
 - The use of spark-generating tools or equipment (drills, portable generators, laptops, etc.) within a classified area.
 - Where motorized equipment operates within a classified area or within 10 feet of a wellhead.

Note: Well-servicing equipment is not exempt from this requirement; however, a permit is only required when a component of the equipment contains an ignition source (e.g., engine compartment) within the classified area or within 10 feet of a wellhead.

A Hot Work Permit is required when:

- Performing Class A or Class B Hot Work.

NOTE: For Class A/B and PSM Facilities the general work permit can be for Class B hot work. Class B Facilities are determined via the Facility Classification Assessment (Class A/B Facilities and Class A/B

Hot Work are two completely different classifications).

- Working on energized circuits including the opening of explosion-proof junction boxes within a classified area.
- Using Thermite (CADWELL) within 75 feet of a hydrocarbon source or within 35 feet of combustible materials.
- Performing welding, cutting, grinding or brazing on any part of a building (partition, walls, floors, ceilings).
- Hot Work is being performed on portable containers or equipment that contains or has contained flammable or combustible material.

Hot Work can be performed without a permit:

- In a designated safe work area.
- When using intrinsically safe tools.
- Using non-intrinsically safe tools (such as cameras, radios, calibration and testing equipment) inside a classified area while continuous atmospheric monitoring is being performed.

NOTE: Either a passive monitor or monitor with pump attached may be used. A personal four-gas monitor (i.e., device that monitors LEL) is permissible, but a personal monitor that only monitors for H₂S is not adequate.

- When the device is a phone or tablet and meets the following criteria:
 - The device must be in good working order.
 - The device must not have a removable battery or internal fan mechanism.
 - External ports cannot be utilized on the device in classified areas.
 - The device must be in a fully protective case (covering sides and back).

A Hot Work Permit is completed by:

- An Authorized Permit Writer.

Hot Work is approved by:

- A Field Supervisor.

A Hot Work permit is good for:

- 12 hours maximum or one complete work shift.
- Permits can be revalidated up to six times or seven shifts provided the following are true:
 - The scope of work has not changed.
 - Each revalidation is authorized on the permit.

Atmospheric conditions and health hazards to be documented on the permit include (safe range):

- Oxygen Level (19.5% – 23.5%).
- H₂S (less than 5 ppm).
- Carbon Monoxide (less than 25 ppm).
- NORM (less than 50 uR/hr).
- Flammability (0%).



When the LEL is greater than 0%, Operations/ Projects Manager approval is required, and a COP representative must validate the permit and provide oversight on location prior to the start of hot work. (OSHA Limit is <10% LEL!) Verbal approval is allowed.

Atmospheric testing must be performed:

- Before work begins.
- After any break.
- After the area has been left unattended.
- During the work when conditions change.
- No less than every two hours.

A Fire Watch is required:

When performing Class A (High Energy) Hot Work, consider the need for additional fire watches when welding or cutting could present fire hazards to adjoining areas (e.g., through walls or floors).

Hot Work Key Steps

1. Determine if a Hot Work permit is required.
2. Obtain initial approval for hot work from a supervisor.
3. Use the permit checklist to review/address hazards.
4. Ensure welding/cutting/brazing equipment meets requirements.
5. Perform isolation and LOTO & Try if needed.



Class A Hot Work on tanks, drums or vessels requires positive isolation!



Single point isolation is not allowed for Hot Work!

6. Prepare equipment for hot work by cleaning and purging if needed.
7. Test the atmosphere and document readings on the permit.
8. Complete a CSE permit if needed.
9. Assign and post a trained fire watch when performing Class A Hot Work.
10. Get final authorization.
11. Complete and post permit.
12. Perform hot work.
13. Retest atmosphere as required.
14. Reissue/Revalidate the permit as required.
15. Leave the fire watch in place for at least 30 minutes after the hot work is complete.
16. Close out and remove the permit.

Hot Tapping

Hot Tapping is defined as attaching a branch connection by welding a tapping fixture and mechanically drilling (i.e., tapping) into pressure vessels, tanks, pipelines or service piping while the equipment is under pressure and in service.

NOTE: A Hot Tap requires an onsite COP Representative.

The Hot Tapping approval process includes:

- A written justification with risk assessment must be submitted to the Operations Manager for approval.
- A Hot Tap work scope, written plan, justification and Operations Manager approval must be attached to the Hot Work Permit.
- Only a specialty contractor with appropriate equipment and experience shall perform hot tapping.

Hot Tie-In

A Hot Tie-In is defined as the process of making welded pipe connections while residual vapors may be present or could burn in a controlled manner at the weld area.

A Hot Tie-In must be preapproved by the appropriate level of management as determined in your respective Business.

NOTE: A Hot Tie-In requires an onsite COP Representative.

Hot Tie-Ins are performed by:

- Facility engineering and A&OI must be consulted prior to any Hot Tie-ins.



Hot tie-in is restricted to pipeline repair and replacement!

In-Service Welding

In-Service Welding is defined as:

- Any welding performed on equipment, pipelines and/or other facilities which have been in hydrocarbon service and are to remain in service, pressurized or not, unless they have been blinded, depressurized and purged such that they cannot be within the flammable range.

NOTE: In-Service Welding requires an onsite COP Representative.

The In-Service Welding approval process includes:

- A written justification with a risk assessment must be submitted to the Operations Manager for approval. In-Service Welding work scope, written plan package, justification and Operations Manager Approval must be attached to the Hot Work Permit.

In-Service Welding can only be performed by:

- A welder qualified to API 1104 Appendix B.

Hydrates (Lower 48 SOP)

A hydrate plug is comprised of water and hydrocarbon and typically forms between a temperature of 35°F and 65°F at pressures greater than 100 psig. Hydrates typically form in flow areas with a pressure drop and high fluid turbulence such as near a control valve or an orifice plate. Indications of hydrate formation include:

- Decreased or lack of gas flow.
- Increased upstream pressure, decreased downstream pressure and increased differential pressure.
- Decreased temperature.

A hydrate plug can resist significant differential pressure. The release of a hydrate plug may act as a piston and compress the downstream gas to a pressure above the maximum allowable working pressure (MAWP) of the piping, or the plug may act as a projectile and approach a speed in excess of 1,000 feet per second. The goal is to thaw the plug without moving it; extreme caution is required.



The release of a hydrate plug may cause significant injuries and damage to equipment! Always stay out of the line of fire to minimize the risk of personal injury!

When dealing with a hydrate plug:

- Determine the location of the hydrate plug.
- Monitor pressure on both sides of the plug.



Do not attempt to push a hydrate plug with an expansive energy source such as a compressor or a gas pipeline!

- Always isolate potential sources of fluid energy from both sides of a hydrate plug.



Do not attempt to remove a hydrate plug without first equalizing the pressure upstream and downstream of the plug!

- Equalized pressure should be reduced below the hydrate formation pressure.



Do not attempt to de-pressure downstream of a hydrate plug to dislodge or to move the plug with gas pressure!



Do not use a hammer or similar tool to hit the piping to release a hydrate plug!

- Allow ambient heat to thaw the hydrate plug. If ambient heat is not high enough, apply heat from an external source to thaw the hydrate plug. External sources may include:
 - Heated air.
 - Vehicle exhaust (this technique may not be used in a partially or fully enclosed building). Only use if there is adequate ventilation to prevent carbon monoxide gas poisoning.



Do not use an open flame such as an acetylene torch or other similar technique to apply significant heat input to a very localized area of the piping. This may weaken the steel and result in a pipe failure and personal injury.

- If heat from an external source is not available, methanol can be introduced into the process stream.
- Once the plug thaws, verify there is an open path for gas flow and restore gas flow.



Stay out of the line of fire of a potential hydrate plug release when gas is reintroduced into the piping system!

Hydrogen Sulfide (H_2S)*

Characteristics of H_2S :

- Toxic, colorless, flammable and corrosive gas.



Can be fatal even in very low concentrations!

- Can have an offensive odor (like rotten eggs) at low concentrations.



**Do not rely on your sense of smell as a warning device.
 H_2S can block sense of smell!**

- Heavier than air. When released, it is likely to travel along the ground to low-lying areas.
- Highly flammable explosive mixture forms with air in concentrations of 4.0 – 44%.
- The byproduct of burning H_2S is sulfur dioxide (SO_2) which is also an extremely toxic gas.
- Extremely corrosive to most metals.

Physical effects of H_2S exposure at different concentrations are detailed in the table below:

Concentration (ppm)	Physical Effects
0.13 ppm	Minimal perceptible odor.
10 ppm	Obvious and unpleasant odor. OSHA permissible exposure limit (8-hour exposure).
15 ppm	OSHA short-term exposure limit (15-minute exposure).
100 ppm	Immediately dangerous to life and health. Impairs the sense of smell in 3 to 15 minutes. May irritate eyes and throat.
500 ppm	Dizziness, breathing stops in a few minutes. Needs prompt artificial respiration.
700 ppm	Unconscious quickly. Death will result if not rescued promptly.
1000 ppm	Unconscious immediately followed by death within minutes.

Safety Requirements/Training

- All personnel required to work near equipment containing H₂S in excess of 10 ppm must be trained in H₂S safety.

Note: Training must be refreshed annually.

- Personal H₂S monitors must always be worn in areas where:
 - Fixed detection devices are not provided; and
 - H₂S is expected to be present in airborne concentrations greater than 10 ppm.
- Personal H₂S monitors must be worn:
 - On the front side of your body in the breathing zone (within 18 inches of your nose).
 - With the sensor exposed, not covered by clothing or located inside a pocket.

Wind-direction indicators must be installed at the following locations:

- Plant sites where the calculated 100 ppm Radius of Exposure (ROE) is 50 feet or greater.
- Facilities where H₂S concentrations exceed 100 ppm in the gas stream or vapor space above produced fluids.

- Wind-direction indicators must be:
 - Visible.
 - Sufficient in number.
 - Installed in prominent locations.
 - Placed in illuminated areas if possible.
- Caution signs must be posted within 50 feet of any facility where the H_2S concentration is 100 ppm or higher in the gas stream or vapor space above produced fluids.
- Danger signs must be posted at the entrance of areas where employees must wear respiratory protection.



- Pipelines must be marked by posting markers (signs).
 - Security fencing must be installed when the H_2S concentration at a production well site or facility exceeds 100 ppm and the site is within:
 - A quarter mile of a public area.
 - A city or incorporated limits of a town.
 - An area where the public could be expected to frequent.
 - Airborne concentrations of H_2S >10 ppm require you to wear appropriate respiratory protection.
 - Airborne concentrations of H_2S >100 ppm require you to wear either:
 - Full Face Positive Pressure SCBA, fully charged.
 - Full Face Positive Pressure Supplied Air Respirator (SAR), equipped with a minimum 5-minute escape bottle.
- Note:** At least one trained and equipped Standby Person must be located outside a work area with an IDLH atmosphere (≥ 100 ppm).

H_2S Rescue

- Time is critical when rescuing a person overcome by H_2S .



Take all precautions first! Do not become another victim!

- Call for emergency assistance.
- Put on a self-contained breathing apparatus (SCBA) before entering the danger area if you are trained and equipped for rescue.
- Move the victim to fresh air at once.
- Begin artificial respiration if the victim is not breathing.
- Begin cardiopulmonary resuscitation (CPR) if the victim has no pulse.

Hydrotesting (Lower 48 SOP)

Equipment Installation and Verification

Confirm the following for on-site equipment:

- The rated pressure of the hydrotest pump is appropriate for the equipment being tested.
- The pump's pressure-relief valve (PRV) is set to relieve at 115% of the specified hydrotest pressure and is sized to relieve 100% of the pump capacity at set pressure.
- The high-pressure trip is set at 110% of test pressure.
- All flexible hoses are secured with whip checks.
- All steel lines are secured using proper engineering design.
- The equipment is spotted to avoid areas where gases or vapors may be present and hot work areas.
- The bleed-off system is operable.
- The equipment to be tested is isolated from the rest of the system.



Isolation should be achieved by using blinds, skilllets or plugs — never by closed valves!

Startup and Hydrotest

- Instruct all personnel to move to a safe location prior to starting the pump.
- Test the pump and lines to the MAWP of the test equipment or to the maximum test pressure of the equipment to be tested.
- Purge the equipment to be tested with test medium to eliminate any trapped air.
- Test for a minimum of 3 minutes unless other instructions are provided.
- Check for leaks using pressure-monitoring equipment.



No one should stand or walk near equipment being tested until the pressure has been released!

- Have the test unit operator give an “ALL CLEAR” signal once all trapped pressure is released.



Identify any potential trapped pressure in the system and release it before breaking connections!



Drain points must not be used to verify pressure; they are prone to plugging!

Knives/Razors

Before a knife or razor is used (including safety knives and razors), a JSA must be performed to discuss the selected tools and its condition.

- If there is a safer alternative, use it even if the job must be suspended while the right tool is obtained.
- Once the proper tool is determined, safe operating procedures should be reviewed (i.e., body positioning, footing and PPE).
- If it is determined that a knife or razor is the proper tool (e.g., a safety knife or razor with a locking guard), cutting procedures should be reviewed before starting work (e.g., cutting motion should be away from and not toward the body).

Note: Kitchen knives used for food preparation are exempted from this policy.

Ladder Safety

Fixed ladder — is permanently attached to a structure, building or other equipment.

- Fixed ladders installed after November 2018 that are 24’ or taller must be equipped with a fall arrest system.
- Fixed ladders 24 feet or taller must be caged or provided with fall protection devices.

Portable ladder — is built to be moved from one job to another such as stepladders and extension ladders.

- Portable ladders must be certified as Type 1-A Industrial Heavy Duty with a 300-pound duty rating.
- Equip all straight and extension ladders with nonslip bases (eg., ladder feet).
- Inspect all fixed and portable ladders before each use for cracks, fading or other damage that might weaken the ladder.
- Remove defective ladders from service and discard.
- Maintain 10 feet of clearance when working around overhead power lines.
- Never use ladders as braces, skids or gangways.
- When ascending or descending a ladder, take the following precautions:
 - Face the ladder and keep the body near the center of the ladder.
 - Do not extend your body beyond the sides of the ladder at any time.
 - Hold ladders at the base until they are secured.
 - Always hold the ladder with at least one hand while climbing or descending the ladder (3-point contact).
 - Carry tools or other work materials in a tool belt or hoist them to the work level.
 - Do not store tools or other materials on ladders.
- Straight ladders must not exceed 30 feet in length.
- Ladder feet should be placed 1 foot back from vertical for every 4 feet of ladder height.
- Use fiberglass rail ladders when working on electrical equipment.
- Only one person on a ladder at a time unless the ladder is specifically designed for multiple people.

Lighting Burners on Fired Vessels

A Hot Work Permit is required before lighting a fired vessel in a classified area unless done by an auto-igniter.

Manual Lighting Procedure:

- Open the pilot burner access port and verify that the system is purged to an LEL reading of <10%.
- Prepare a manual lighting torch by completing the following tasks:
 - The torch handle should be nonflammable, flexible and long enough to extend the lit end to the pilot burner without placing hands inside or in front of the port.
 - Insert the unlit torch into the port until the end is to the pilot burner. Mark a reference point on the torch handle at the entrance of the access port.

- Bend the torch handle so your hands are not placed in front of the port when lighting the pilot.
- Ensure extinguishing material is in the immediate area.
- Light the pilot burner as follows:
 - Ignite the torch.



Hands and face should never enter or be in front of the access port! Also, never look directly into — nor stand in front of — the end of the access port when lighting the burner!

- Insert the torch into the access port to the premarked reference point.
- Open the pilot light fuel valve and listen for ignition.
- After ignition, remove and extinguish the torch.
- Replace the pilot burner access port cap and check the flame through the viewing window.

Automatic Lighting Procedure:

- Open the pilot burner access port and verify the system is purged to an LEL reading of <10%.
- Open the pilot light fuel supply valve.
- To light the pilot burner, actuate the pilot igniter control and push the igniter until you hear a snap.

Note: You may need to repeatedly push the igniter before it lights.

- Listen for ignition before releasing the igniter.
- Visually check the flame through the viewing window.

Note: Pilot flame should be a steady, long, rolling and yellow-tipped.

Lone Worker

Field personnel frequently work alone and in potentially hazardous situations. Each BU or asset is expected to develop and communicate a Lone Worker program that is appropriate to safeguard the workers in their operation.

Contractors working for COP are also expected to have a Lone Worker program for their personnel.

Long-Term Isolation

Long-Term Isolation or Equipment Out-Of-Service:

- LOTO should NOT be used for Long-Term Isolation. Using the LOTO process should not exceed two weeks unless the equipment is actively being managed through the corrective maintenance work order. If a corrective maintenance work order is not in place, the isolation should be changed to an Operational Lock/Tag.
- For equipment that is not going to be used but remains connected to the process, blinding should be installed and an Operational Tag must be applied. If physically disconnecting the equipment, remove spools, valve, etc., and install properly rated blinds to cover open ends of process equipment.
- Complete an MOC prior to changing the operation of any facility including permanently taking equipment out of service at an active facility.

Machine and Equipment Guarding

Effective machine and equipment guards prevent the operator and other workers from placing parts of their bodies near hazardous moving parts.

- Guards must be provided to protect personnel from hazards such as sharp edges or blades, rotating parts, flying chips and sparks.
- Guards must prevent hands, arms and any other part of a worker's body from contacting dangerous moving parts.
- Guards should be inspected each time a piece of equipment is used and repaired or replaced if it no longer provides the intended protection.



PPE is never a substitute for proper machine or equipment guarding!



Removal of covers and/or guards from machinery while in operation is prohibited!

Management of Change (MOC)

The intent of an MOC is to ensure changes are designed without unintended consequences, which includes understanding the added risk of a change, mitigating where needed, and effectively communicating to relevant parties.

Changes to all Lower 48 facilities shall be vetted through operations and engineering to determine if the change should be pursued and an MOC initiated. Simple changes can be executed with a limited number of reviewers and approvers (Simple MOC); however, more complex changes shall undergo an extended assessment and approval process (Standard MOC). All changes must be risk-assessed and shall be approved by the associated Operations and Engineering supervision.

If the change meets any of the following conditions, the MOC must follow the Standard MOC Path, which includes an Extended Assessment.

- The Facility is classified as PSM or A/B.
 - The change modifies or adds to existing operating parameters.
 - The change increases process safety or Environmental/Regulatory Consequences.
 - The Engineering or Operations Supervisor recommends additional reviewers be added.
- Note:** A “Replacement in Kind” exchange (i.e., equipment is same rating) does not require an MOC.

Wells MOC

An MOC is required for any deviation from programs, procedures, work instructions, equipment, well design, operating parameters, existing risk assessments, etc., that leads to change in the risk profile of a well or operation. The Wells MOC process includes the following actions:

- Prior to initiating an MOC, the proposed change must be justifiable from a business perspective using the following criteria:
 - A regulatory or legal obligation exists.
 - Produces improvement in POP (Put on Production) time.
 - Generates cost savings or additional revenue.
 - Improves Integrated Work Schedule.
- Once the change has been justified, the MOC initiator and associated engineer will complete the MOC Form and generate a risk assessment for the proposed changes.

- The results of the risk assessment will determine the requirements for MOC review and approval as well as the actions that must be taken to communicate and document the changes prior to implementation.

Note: If the event is a “Like Kind” exchange (i.e., equipment is replaced with another of the same model, size and pressure rating) or “Routine/Recurrent” with specific procedures already in place to control change, ensuring the involvement of appropriate expertise (i.e., fishing operations during Frac, setting a bridge plug if production casing floats fail, CBL on surface casing if no returns, mud cap bit trip, etc.) an MOC is not required.

Personnel Management of Change (PMOC):

PMOC is required for new employees and when employees change positions. The intent of the PMOC is to ensure that the proper level of HSE training is assigned to an individual and that the individual is made aware of job expectations. The PMOC process is managed through the Corporate/Lower 48 Training Group and is assigned and tracked in the MyLearning platform.

Organizational Management of Change (OMOC):

OMOC is required when significant changes in functions or teams occur. When changing organizational structure or incorporating new assets into the Lower 48, a specific plan will be developed to address organization needs. The OMOC will depend on the size of the acquisition or reorganization. The OMOC Process is independent of the requirements in this Manual and is at the discretion of BU Management.

Manual Lifting/Carrying Loads

Proper lifting techniques when manually lifting and carrying objects are:

- Test the load to see if you can lift it safely.



Max single person lift — 50 pounds!

- Choose hand placement to avoid pinch points.
- Use material handling aids (stiffy tool, rope sling, hook) for heavy items without safe handholds.
- Slide the load toward you before picking it up.
- Objects in trailers or pickup beds should be slid to the edge before being picked up.



NEVER reach into the back or over the sides of a pickup and try to lift a load over the sides of the bed!

- Stand close to the load with your feet spread apart (about shoulder width with one foot slightly in front of the other for balance).
- Keep your back straight, bend your knees (not your waist), but not past 90 degrees.
- Get a firm grasp of the object with both hands before beginning the lift. Make sure the load is balanced in your hands.
- Look up to the horizon and begin slowly lifting with your legs by straightening them.
- Keep the load close to your body to prevent straining the lower back.
- Move your feet so that they point in the direction of the lift as you turn.



Never twist your body during lifting or carrying!

- Make sure that your travel path is clear of obstructions and that there are no slip hazards.
- If you must turn while carrying the load, turn using your feet, not your torso.
- Handle a load when it is too heavy to safely lift by:
 - Getting another person to help you or use mechanical assistance (hand trucks, carts) to avoid lifting.
 - Using mechanical equipment for lifting or dragging loads over 100 pounds.

Naturally Occurring Radioactive Material (NORM)*

NORM is a form of ionizing radiation that is associated with oil and gas production and is commonly found in areas where scale accumulated.

A NORM survey should be conducted in the following circumstances:

- Used oil and gas process equipment prior to disposal or intracompany transfers.
- Used oil and gas process equipment being considered for purchase by COP.
- Prior to commencing work when cleaning or working on gas-processing or production equipment where airborne particulates have the potential to be generated.
- On all equipment being removed from service (e.g., vessels, line pipe, tubing and tanks) prior to sale or release for unrestricted use (i.e., sale to third parties, including scrap dealers).

The following precautions must be taken when workers may be exposed to NORM in excess of 50 microrems per hour or during maintenance, equipment handling or repair, and vessel entry where workers may have direct physical contact with NORM-contaminated solids.

- Advise personnel of the presence of NORM contamination and of the procedures to minimize exposure.
- Ensure that only personnel necessary for the job are present.
- Avoid direct skin contact with radioactive scale and solids.
- Wear gloves, protective clothing and waterproof bandages over open wounds (e.g., cuts or abrasions).
- Ensure that personnel do not eat, drink, smoke, chew, or apply cosmetics in the work area where NORM has the potential to exist.
- Ensure that personnel wash their hands and face immediately following any skin contact that occurs with materials that have the potential to contain NORM and at the end of the work period.
- Wear proper personal protection garments and equipment (refer to the Asset PPE Matrix) for maintenance of contaminated equipment or systems and to minimize inhalation, ingestion and skin contact.
- Keep surfaces wet that might contain NORM, whenever possible.
- When opening contaminated equipment, the equipment shall be removed from service, vented and left idle for four hours (beginning when the product stops entering the vessel or equipment) prior to maintenance. (This is done to aid in dispersing the radon gas and preventing inhalation.)
- Seal or wrap in plastic the openings on contaminated equipment whenever possible.

Surplus/junk equipment and scale/sludge with NORM levels at or above 50 microrems per hour must be labeled and stored on-site until proper disposal options are given or the NORM-contaminated equipment is transferred to another COP storage location. Check with your local HSE resource for transportation and/or disposal guidance.

Additional precautions must be taken whenever extensive removal of NORM-contaminated material is required or where work requires grinding, drilling, polishing, welding, brazing or metalizing.

Overhead Powerlines

The following requirements apply to all operations that involve “elevating” mobile equipment.

“Elevating” mobile equipment is any mobile equipment which has the ability to reach an overhead power line including but not limited to manlifts, track

hoes, back hoes, bucket trucks, hydro-excavators, forklifts, cranes, conveyors, dump trucks, rigs, etc.

Minimum Clearance Distances

Minimum clearance distances to electrical lines or electrical cables for “elevating” mobile equipment “**during operation**”:

Voltage (kV ac)	Minimum Clearance Distance (feet) during operation
Up to 50 — most common oil field application	10 (controls required <20ft)
Over 50 to 200	15 (controls required <20ft)
Up to 350	20
Over 350 to 1000	45
Over 1000	Check with operator/engineer

Minimum clearance distances to electrical lines or electrical cables for equipment “in transit” — and cranes with no load. In transit refers to equipment (elevating or otherwise) that is moving between locations either as cargo or on its own, but is not being used for any other purpose.

Voltage (kV ac)	Minimum Clearance Distance (feet) in transit
Up to 0.75	4
Over 0.75 to 50	6
Over 50 to 345	10
Over 345 to 750	16
Over 750 to 1000	20



Two (2) or more control measures (as described below) shall be implemented anytime cranes or other “elevating” mobile equipment is in operation (other than in transit) and the equipment could possibly encroach the minimum safe clearance distances outlined above.

Unless there is a physical barrier in place that would restrict the movement of the “elevating” mobile equipment from encroaching on the minimum safe clearance distance within the limits of its range of motion, it is “possible” for the equipment to encroach.

Example: The full extension of the elevating equipment must be considered when calculating range of motion. If a manlift has the ability to extend 65 feet from its base, its range of motion is always 65ft.



Any overhead electrical lines that cross over any part of the pad or within 20 feet of the pad are likely to be within the “possible” minimum clearance distance for most “elevating” mobile equipment.

Overhead Power Line Controls

JSA/Go Card

Overhead electrical hazards should be identified on the JSA and include the controls utilized to manage the hazard as well as identify the spotter(s) when utilized.

Two (2) or more of the following control measures shall be implemented anytime cranes or other “elevating” mobile equipment is in operation (other than in transit) and the equipment could possibly encroach the minimum safe clearance distances.

Control #1 — Utility Controls

Utility Control — Site-specific utility controls (e.g., line raising, temporary or permanent line relocation, temporary outages, etc.) are one of the preferred methods of control for locations with longer-term operations or high volumes of “elevating” equipment. These controls take preplanning and electrical expertise to apply.

Control #2 — Signs/Goal Posts (combinations of signage/goal posts/construction barricades are considered one control method)

Overhead power line signs/goal posts are useful to draw attention to the lines that may not otherwise be obvious. However, signs/goal posts should

not solely be relied upon when minimum clearance distances cannot be maintained.

Signage — Identification/signage may need to cover more than one of the three parts of the view plane.

- a. High elevation — (e.g., Ribbon tied to overhead goal posts)
- b. Medium elevation — (e.g., Danger – Overhead Lines sign at eye level)
- c. Low elevation — (e.g., Safety cones on the ROW)

Permanent overhead line signage is recommended where overhead power lines crossroads and it is possible for equipment to be “in transit” underneath the lines.



Signs next to roads do not replace the need for route assessments and line height determinations where encroachments on the “in transit” minimum clearance distance is possible.

Temporary overhead line signage is recommended for short-term operations involving “elevating” mobile equipment.

When utilizing temporary overhead line signs, they should be placed every six (6) feet along the line, where it is “possible” to encroach on the minimum clearance distances.

Construction barricades or temporary fencing should be considered when it is necessary to prevent elevating equipment from impeding on clearance distances or to limit crossings under power lines to designate areas. Signs should be used with barricades/temporary fencing.



Signage should be in English and Spanish, yellow or orange, and stand up on its own. Below is an appropriate example.



SmartSign.com | Part #D8PI

Goal Posts are recommended on Right of Ways (ROW) or other areas where elevating equipment needs to pass underneath overhead power lines while in operation.

Goal Posts may also be necessary when a sign is needed in the medium or high view plane (e.g., when swinging a manlift near power lines at elevation, etc.)



Control #3 — Spotters

An “elevating” mobile equipment/vehicle spotter is required anytime the equipment is positioning, backing, raising, lowering, extending, etc., and it is possible to encroach on the minimum clearance distance. This includes during loading and unloading activities.

Spotter — A trained and dedicated employee **not engaging in any other duties while performing spotting duties**. Their task is to monitor and direct traffic around ground and overhead obstructions and warn operators of any potential danger.

Spotter responsibilities include:

- Remain in clear view of the operator at all times.
- Spotters and operators should agree on handle signals/communication prior to operation.
- Stand far enough behind or in front of the vehicle to observe the path and any obstructions, and to allow for sufficient stopping distance in an emergency. Spotters shall not be positioned between the vehicle direction of travel and an obstacle.
- Immediately signal the operator to stop if any person or object enters the vehicle's intended path of travel, or if the spotter is uncertain that the intended path of travel is clear. This includes to the side, front, rear and overhead of the vehicle/mobile equipment.
- If the spotter leaves the area for any reason or has to attend to any other duty, the equipment must stop moving. The operator cannot move any equipment without the dedicated spotter present.
- Spotters cannot use personal mobile phones, iPads, headphones or other items that could distract them from their spotting duties.
- Spotters shall be equipped with a nonvisual warning device to warn operators, e.g., safety whistles, air horn or radio.
- More than one spotter may be necessary if there are multiple hazards, communication cannot be maintained by one, or if multiple angles are needed.

Control #4 — Proximity Monitors

Generally, proximity monitors may be used when equipment is passing underneath power lines on right-of-ways (ROWS).



Proximity monitors must be properly calibrated and maintained.

Personal Protective Equipment (PPE)*

Basic PPE Requirements for Field Locations:

- PPE is worn when engineering and administrative controls cannot provide adequate protection.

- Wear the right PPE for the job, the specific task being performed and the hazards that may be encountered.
Note: Workplace task hazard assessments are performed to determine required PPE in the workplace.
- The following minimum PPE must be always worn in the field:
 - Eye protection.
 - Head protection.
 - Foot protection.
 - Fire-retardant work clothing.

A higher level of protection must be used when indicated on the JSA or Task Hazard Assessment.

Use only company-approved or company-issued PPE.

The minimum requirements for basic PPE are outlined in the following table:

Item	Performance and specification requirements
Eye protection and side shields	OSHA 1910.133 and ANSI Z87.1-1989
Head protection - Helmets and hard hats	OSHA 1910.135 and ANSI Z89.1-1997 Type I Class E (formerly Class B) for working at a field location.
Rainwear	ASTM D6413 or NFPA 2112
Hand protection - Electrical/insulating gloves	American Society for Testing and Materials (ASTM) D120-09
Foot protection <ul style="list-style-type: none">• Safety-toe boots• Rubber/neoprene boots• Waterproof boots	Occupational Safety and Health Administration (OSHA) Standard 1910.136 and ASTM F 2412 / 2413 <ul style="list-style-type: none">• Class 75 toe protection rating• Class 75 toe protection rating• Class 75 toe protection rating

- FRC requirements should meet or exceed the requirements set out in NFPA 2112 or NFPA 70e.

Foot Protection

- Wear safety-toed footwear that meets the OSHA and ASTM/ANSI requirements.
Note: Visitors who are only observing field operations and do not have safety-toe footwear must be escorted by an employee.

- Electrical hazard footwear must be worn in accordance with the Electrical Safety Manual.
- Ice gripper footwear must be readily available and worn when weather conditions include snow, ice or slippery walking surfaces.

Eye Protection

- Must conform to OSHA 1910.133 and ANSI Z87.1-1989.
- Tinted or absorptive lenses must be avoided indoors where hazards are present.
- Prescription safety glasses with side shields are acceptable.
- An adapter must be available for employees who use full-face respirators with prescription lenses.
- Contact lenses are allowed but must be used in conjunction with other approved eye protection.
- Wear additional eye protection as determined in the JSA or Task Hazard Assessment.

Face Protection

- Wear face shields, as needed, to protect the face and neck from flying particles and sprays of hazardous liquids.
- Always wear safety glasses or goggles under the face shield.

Head Protection

- Wear a Type I Class E hard hat.



Do not wear metal hard hats and bump caps!

- Wear a hard hat with dielectric protection when working in an area where contact with electrical current is possible.
- Inspect your hard hat every six months for cracks, signs of impact or rough treatment and prolonged exposure to UV light. Discard if you see signs of chalking or cracking.



Hard hats may not be altered in any way such as drilling holes, painting, cutting or carving!

- Hard hat liners must be made from 100% cotton, 100% wool, cotton-wool blend or fire-retardant material.

Clothing

- Wear clothing adequate to provide bodily protection and to protect against hot lines, hot liquids, skin irritants, flash fires and other hazards.

- Fire-resistant clothing (FRC) should be worn as the outermost layer. FRC should be worn with the shirt tucked in, sleeves rolled down, and all buttons or zippers fastened.
- Clothing worn underneath FRC must be made from 100% cotton, 100% wool or cotton/wool blend.

Prohibited Clothing	Prohibited Items
<ul style="list-style-type: none">• Loose/baggy clothing• Neckties/scarves• Tie belts	<ul style="list-style-type: none">• Finger rings• Earrings• Necklaces

- Exposed jewelry (rings, watches, necklaces, etc.) other than for medical identification may not be worn on work sites. Medical-identification jewelry must be worn in a way that does not pose an entanglement hazard.
- Long hair must be confined in a manner that does not pose an entanglement hazard.



Ensure that long hair is tucked inside of the hard hat and it does not interfere with the hat's suspension!

Chemical Protective Clothing

- Chemical protective clothing (e.g., slicker suits, Tyvek®, aprons) must be worn when exposed to chemicals that present a skin contact hazard.
- Chemical clothing selected during the workplace task hazard assessment must be resistant to penetration, degradation or permeation. Consult the SDS for PPE guidance.

Note: FRC must be worn in addition to chemical protective clothing when a fire hazard also exists.

Hand Protection

Wear the gloves that provide the best protection from the hazards of the job (e.g., impact, chemicals, cuts, flames or contact with bloodborne pathogens).

Glove Types	Proper Use
	General Purpose Fabric or Leather Gloves can protect your hands from minor scrapes and cuts while handling rough or burred materials; when working around moderately sharp edges; when working with moderate heat; or for tasks that may generate sparks or fragments.
	Precision Gloves are high-dexterity gloves that can protect your hands from minor scrapes and cuts. They should be worn while working with small parts or tight spaces, such as when working on engines.
	Impact/Crush-Resistant Gloves were developed to reduce lacerations, bruises and fractures from blows and crushing forces. Designed with high-cut resistance for puncture protection, and impact protection on back of hand and fingers for contusion and crush protection, they may be worn to mitigate “struck by” and pinch point injuries. These gloves may be appropriate for tasks that involve handling heavy objects or tools, but don’t require manual dexterity.
	Chemical Impervious Gloves, such as neoprene, polyvinyl chloride (PVC) or polyvinyl alcohol (PVA), should be used to protect the hands from contact with corrosives such as organic acids and petroleum products. Use of these gloves may also prevent other glove types from being ruined. Be sure to review the MSDS for the material being handled to ensure that the gloves are correct for the application.

	<p>Cut-Resistant Gloves, such as metal mesh or Kevlar, should be worn when handling sharp material, cutting materials or using tools with sharp edges. These types of gloves are cut-resistant, but not puncture-proof.</p>
	<p>Insulated Electricians Rubber Gloves should be worn when working on or near electrical equipment (ANSI/ASTM D120-1984).</p>
	<p>Leather Welder's Gauntlets/Gloves should be worn to protect from hot slag and metal due to welding.</p>
	<p>Sandblasting Gloves should be worn to protect against damage while sand blasting.</p>
	<p>Cold/Wet Weather Gloves should be worn when working in cold/wet environments to maintain dexterity.</p>

Pigging Operations Lower 48 SOP)

- All personnel (employees and contractors) performing pigging operations must be trained in the appropriate pigging procedure.
- Pig launchers and receivers are considered confined spaces.

- Liquid collected from pig launchers and receivers should be drained and properly disposed of.

Note: Corrosion control chemicals and other hazards may be present in these liquids.

- Ensure the following for pigging operations:
 - Isolate connected piping not being pigged.
 - Ensure venting locations have adequate venting and spill prevention capability.
 - All equipment is ready for service and nonessential items are removed from the area.
 - Drain and vent valves are not plugged by debris prior to commencing pigging.
 - All corrosion coupons are removed from the system components being pigged. At a minimum, raise the coupon into its riser pipe and lock it in the retracted position.
 - Do not open launchers and receivers with leaking valves. Report these immediately and ensure they are repaired or replaced.
 - Do NOT open the enclosure until you are certain there is NO trapped pressure in the pig launcher or receiver.



Never stand in front of a closure door when opening to remove a pig! Stand to one side of the closure on the opposite side of the door hinge!



Never look into the barrel of a receiver or launcher! Use a mechanic's mirror and an intrinsically safe flashlight to look from the side!

Pipe Handling and Storage

- All pipe in transit must be properly secured (e.g., with nylon straps and ratchet boomers).
- Pipe trailers should be equipped with a minimum of four posts secured to the trailer's side rails that are sufficiently tall and strong to keep the pipe from rolling off the trailer while in transit.
- All pipe in storage must be properly secured (e.g., on pipe racks secured from accidental movement by nylon straps, chocks, pins and ratchet boomer or other suitable means).



Do not put fingers or hands into ends of pipe when handling pipe manually!

- When moving pipe using a mechanical lifting device, use tag lines attached to the end of the load, and not to the lift sling, to help guide and position the load.
- Pipe loaded or unloaded on pipe racks must have the bottom layer pinned or blocked securely on all four corners. Each successive layer must then be effectively chocked or blocked.



Do not walk or stand under a suspended load and do not stand between joints of pipe being rolled!

Post-Incident Management*

Unplanned Event is an event that is neither planned nor expected to occur. **Incident** is an unplanned event resulting in a loss (e.g., injury, damage, public complaint, product release, environmental impact, nonconformance and enforcement actions), including failure of processes and procedures. **Near Miss** is an unplanned event with no consequence, but the circumstances could have resulted in injury, property or environmental damage, process upset or other disruption.

Initial Response

- The incident site must be secured, preserved and contained to prevent:
 - Further injuries.
 - Continuation of a release event.
 - Equipment damage.
 - Loss of investigation evidence.
- Activate the Emergency Response Plan, if required.
- Provide initial first aid if required.
- Contact Axiom (877-502-9466) for any injury so a licensed health care provider can provide first-aid guidance and further injury care recommendations.

Note: For injured service company employees, Axiom or a similar medical support group can fulfill this requirement.

- Dispatch emergency medical services if required.
- Accompany any injured COP employees and contractors taken to medical facilities.
- Unplanned events must be reported to the COP supervisor immediately.

Reporting

- All incidents and near misses must be reported to the first line supervisor and HSE as soon as practical. Some federal reporting requirements include reporting within 15 minutes; therefore, preliminary information must be reported promptly.
- All loss of primary containment events resulting in unplanned or unpermitted released or emissions, regardless of volume or secondary containment, shall be reported in InteleX.
- All Incidents and Near Misses that meet corporate and/or regulatory reporting thresholds must be entered into InteleX.
- Initial InteleX entries must be made within two business days.

Investigation

- An investigation should be initiated according to the Post Incident Management Procedure.
Note: An investigation may involve a large team or only one or two individuals depending on the risk potential and complexity.
- BU/Asset leadership, with guidance from HSE, will choose the most appropriate investigation method to best understand the incident cause and identify needed improvements.

Pressure — Working with (Trapped, Systems, Venting/Bleeding)

Pressure Systems

Pressure systems can contain significant potential energy. Opening the pressure system can release solid, liquid or gaseous toxic materials and can generate heat or cold that may be harmful to people or to the environment.

- Pressure piping and facilities must be designed, constructed, maintained and modified in accordance with COP or appropriate industry standards.
- Open and close valves slowly when the valves are under pressure.



Stay to the side of the valve stem when opening or closing a valve!

- Best practice is to count and post the number of turns necessary to open and close the wellhead master valve.



Use only tapped bull plugs in pressurized systems!

Trapped Pressure

- Identify hazards associated with trapped pressure (e.g., chemical spray) during the JSA and ensure that proper PPE is available and worn.



STOP the job and determine the best way to proceed when hazards identified during the JSA cannot be mitigated!

- Always check for trapped pressure by opening bleed ports before opening any piping or equipment.
 - Trace lines carefully from the line opening point to the bleed point and isolation devices.
 - Isolation procedures should incorporate a high-point bleed within the isolated section of piping and equipment.
 - Pressure may be bled from a system using either the low-point drain or high-point bleed as long as a final verification is made by opening the high-point bleed due to potential plugging of the low-point drain.
- Note:** Low-point drain points should generally be used to drain fluid. Low-point drains that can become clogged should be rodded out to ensure they are clear.



Use only a high-point bleed to verify all pressure has been relieved!

- Keep body and hands out of Line of Fire when removing plugs or caps.



Use tools, not your hands, to remove plugs or caps that may have pressure behind them!

- Verification that there is no trapped pressure in the system should be completed after equipment is shut down, locked and tagged out, and the gauges read zero pressure.



Always “Try” by opening bleed ports to ensure pressure is relieved before working on equipment!

Venting/Bleeding

- Bleed or vent pressure to the atmosphere as follows:
 - Into a closed system when possible.
 - At a controlled rate.
 - At a location free from nearby sources of ignition.

- In a direction that is not potentially dangerous to personnel.
- Provide containment for any liquids bled or vented.
- Anchor pressure relief lines and any above-ground pressurized line that could move during operations per Engineering specifications.
- Stand to one side when bleeding down pressure even if you think all pressure has been bled down.
- Stay alert for the presence of trapped pressure due to plugging or hydrate formation.
- During venting, personnel must **NOT**:
 - Use backpressure valves for isolation.
 - Use a valve as a choke unless the valve is designed to do so.
 - Assume a pressure reading is accurate or valve or tubing is unobstructed.



Do not rely solely on pressure gauges!

Personnel must NOT (cont):

- Assume low pressures are not hazardous.
- Bleed through elbow connections.
- Vent hydrocarbons in confined spaces.
- Rely solely on a check valve for isolation.

Opening Piping, Tanks and Vessels

Opening equipment for repair or inspection requires special precautions including:

- Tools, lighting and instruments used in atmospheres containing flammable vapors must be rated for the area's classification (see the Electrical Safety section).
- Vessels or tank entry must comply with COP Confined Space Entry requirements.
- Cutting, welding, burning and grinding must comply with COP Hot Work requirements.
- Isolate potential energy sources prior to opening the process using the approved isolation procedure and according to the COP Lockout/Tagout & Try requirements.
- Ensure all sources of ignition are extinguished or eliminated.
- Ensure adequate venting to avoid collapsing the vessel when draining it.
- Check for radiation hazards such as Naturally Occurring Radiation Material (NORM).
- Assure adequate containment and spill prevention has been provided prior to opening tanks.

Pressure Washer Requirements

Portable pressure washers may be one of the following:

- Type 1 washer — capable of 100 psig or less of fluid pressure as measured at the discharge nozzle.
- Type 2 washer — has 8 hydraulic horsepower (HP) or less and 100–3200 psig fluid pressure at the discharge nozzle.
- Type 3 washer — with 8–23 HP and 3200–5000 psig fluid pressure at the discharge nozzle.

Pressure washer operations should comply with the following:

- Operators are trained on the hazards of portable power washing equipment.
- Warning labels on potential risks are installed on the washer.
- Type 1 washer:
 - May be a continuous flow design or incorporate provision for manual shutoff of the fluid flow.
- Type 2 washer:
 - Manually actuated “deadman” controls are provided on the wand. The trigger is guarded and will go to the “off” position when released.
 - Triggers are at least 29.5 inches from the discharge nozzle.

Note: If the wand can be detached from the trigger, ensure that cleaning fluid cannot be discharged with the wand removed or when the discharge pressure is greater than 100 psig.
- Type 3 washer:
 - Complies with all requirements for a Type 2 washer.
 - The trigger is located at least 4 feet from the discharge nozzle.
 - Nonmetallic hoses used to connect the wand to the washer are shrouded with a protective device for at least 2 feet from the nearest grasping area of the wand.

Note: The shroud must interrupt and disperse the fluid flow in the event of hose rupture to prevent operator injury.

Pre-Startup Safety Review (PSSR)*

A PSSR is the final multidiscipline review led by Operations in the following situations:

- Management of Change (MOC) that involves startup of modified piping/equipment, removal of equipment, temporary change or the addition of new equipment.

- Startup after a turnaround at PSM facilities.
- Startup of new units/facilities.
- Restarting a facility, process or piece of equipment that has been out of service for more than 30 days.
- At the discretion of management, a nonphysical change may require a PSSR.
- Plugging and abandoning a well.
- Prior to commissioning of a temporary change.
- Return to Original Service when a temporary change is removed.
- If a temporary change is made permanent.

The installation and correct functioning of equipment and/or software is key prior to the introduction of hydrocarbon.

A PSSR should ensure:

- Construction has been completed per design specifications.
- Operating procedures, including the safe operating limits, are written and reviewed (include safety, emergency and maintenance procedures as applicable).
- Assigned operating and maintenance personnel are trained how to safely and efficiently run the facility.
- Safety equipment is in working order.
- Regulatory compliance has been met.
- Missing risk assessment action items have been resolved and closed.
- All documentation necessary to close the MOC (when required) is complete and updated.

NOTE: Required PSSR documentation is included in the Manual.

Pumping Units

The following guidelines apply to pumping units:

- Pumping units must be guarded and color-coded in accordance with the latest edition of API RP 11ER.
- The pumping unit must be properly isolated (LOTO & Try) following approved procedures prior to performing any work on or near the unit.
- No one is allowed in the guarded area (i.e., protected with guardrails or machine guards) of a pumping unit or other piece of equipment until the unit is shut down and locked out.

Note: An exception to this occurs when the equipment is designed where an individual must enter the guarded area to shut down the pumping unit or to perform LOTO.

- If it is necessary for the unit to be started while a well servicing unit is in place, the individual in charge must be certain that all personnel and equipment are clear of the moving parts of the unit.
- Throat bolts or equivalent must be installed and kept in place during normal operations.
- Shutting down adjacent pumping units should be evaluated on multi-well pads when performing specific well intervention activities (for example, consider shutting down while rigging up/down to prevent guy wires from becoming entangled in adjacent units and pulling the rig over).

Pumps

The following guidelines apply to the operation of pumps:

- Discharge piping on every positive displacement pump must include a pressure relief valve capable of protecting downstream equipment from overpressure.
- Plunger cages should be covered to prevent fluids from spraying and broken plunger pieces from flying in the event of a plunger failure.
- Never operate a positive displacement pump against a closed discharge valve.
- Bleed pressure off the pulsation dampener before working on the dampener.
- Rotating or reciprocating parts on pumps (e.g., plunger shafts) should be guarded to protect against unintentional human contact.

Purging Operations (Lower 48 SOP)

Purging is the act of removing a hazardous gas or liquid from a pipe or vessel and replacing it with a nonhazardous gas or liquid prior to performing other work. The main danger in purging is the potential to form flammable mixtures.

It is critical during purging activities to:

1. Eliminate all ignition sources prior to beginning the purging process.
2. Verify through testing that the oxygen or flammable gas levels are within acceptable ranges prior to introducing potential ignition sources.



All purging operations must follow approved Purging SOPs or SOGs (standard operating procedures or guidelines)!

Quality Management

Objectives of a Quality Management program are:

- Prevention over Inspection
- Continuous Improvement
- Compliance with Applicable Codes & Regulations
- Cost-Effective Concepts and Systems
- Minimize Internal and External Errors

A Quality Management System (QMS)

- Coordinates and directs an organization's activities to meet regulatory, industry code of construction and COP Lower 48 Engineering Specification requirements.
- Provides guidance to accomplish Quality Assurance (QA), Quality Control (QC) and inspection functions related to the engineering design, procurement, fabrication, construction, installation, testing, repair and maintenance of COP-operated equipment and facilities.

- Includes provisions for monitoring, measurement, nonconformance identification, reporting and resolution, metrics and internal auditing.

Note: The Lower 48 QMS is maintained by the Lower 48 QA-Project Integrity Organization with additional documented requirements residing in the Lower 48 Engineering Specification and Guidelines.


- For new and modified facilities, COP engineers must ensure that the Lower 48 Engineering Specifications are incorporated into design of facilities and equipment.
- QA/QC principles and resources must be used during fabrication, installation, commissioning and startup to help ensure that what was designed is delivered to Operations.
- The COP Inspection, Testing and Repair (ITR) processes will be used to help maintain equipment and assets through their life cycle.

Radiation Safety

Radiation sources that may be found in Lower 48 COP operations include:

- **Non-ionizing radiation** can be found in welding and cutting operations, microwave ovens and around communications equipment.
- **Ionizing radiation** includes contract radiography, radioactive tracer surveys and the use of density meters and survey meters containing radioactive cesium.

- **Radiographic inspection** is normally performed in a restricted area.
 - Warning notices must be displayed at the controlled area boundary at suitable positions. The notices should bear the international radiation trefoil symbol, warnings and appropriate instructions in the local language.
 - Before the start of radiographic work, the area is to be cleared of all people except for authorized personnel. The boundary should be clearly visible and well-lit and continuously patrolled to ensure that unauthorized people do not enter the controlled area. If the boundary is large, or if it cannot be seen from one position or not secured by physical means, more than one person will need to patrol the area.

 **All signs and boundaries must be observed, and entry into the restricted area is prohibited without prior permission from the lead Radiographer!**

- **Radioactive (RA) tracer-containing wastes** must be managed per state and federal land RA tracer waste management requirements.
 - In most cases, the vendor providing the RA tracer material must survey and sample the material for concentration levels to ensure worker safety and appropriate disposal.


Relief Devices*

All pressure vessels must be protected by a safety relief device (PSV or PRV) set at or below the maximum allowable working pressure (MAWP) of the vessel.

Relief devices must be managed in accordance with Lower 48 ITR:

- Pressure Relief Devices Manual and any applicable local, state or federal rules.

NOTE: A Bypass permit is required any time a PRD is blocked in for inspection, testing or repair.

 **Before inspecting, testing or repairing any safety relief device, general precautions must be taken to maintain the safety of the equipment protected by the devices — especially if the equipment is in operation!**



When inspection, testing or repairs on a vessel are required, operation conditions must be normal and the proper authority and permits (including Bypass permit) for the work must be obtained!

Refer to the following for more information:

- Lower 48 Engineering Guidelines, Recommendations and Specifications (GRS) for design and installation of relief devices.
- Lower 48 ITR – Pressure Relief Devices Manual.

Respiratory Protection*

COP employees who may need to wear respiratory protection to perform work in a hazardous atmosphere or to serve as part of a COP emergency response team must meet the following:

- Be enrolled in the COP respiratory medical surveillance program.
- Be trained on the use, proper fit and maintenance of their respiratory protection equipment.
- Participate in qualitative or quantitative fit-testing.
- Have no facial hair in the face-piece seal area.
- Wear no eyeglasses with temple bars that interfere with the face-piece seal area.

IDLH (Immediately Dangerous to Life and Health) Atmospheres

- Requirements for IDLH atmospheres are:
 - Use a National Institute of Occupational Safety & Health (NIOSH)-certified respirator, either:
 - A full face-piece, pressure-demand SCBA for a minimum service life of 30 minutes, or
 - A combination full face-piece, pressure-demand SAR with auxiliary self-contained escape cylinder.
- Utilize a Standby Person outside the IDLH atmosphere and equipped with:
 - Pressure-demand or other positive-pressure SCBAs.
 - Pressure-demand or other positive-pressure SARs with auxiliary SCBAs.
 - Appropriate retrieval equipment for removing the personnel who are in the hazardous atmosphere.

Non-IDLH Atmospheres

Non-IDLH atmosphere requirements for protection against gases, vapors and particulates are:

- Use a Supplied Air Respirator, or
- Use an air-purifying respirator that is appropriate for the hazard.



Air-purifying respirators are limited by cartridge or canister type, exposure levels and service life. Consult your local HSE Representative for guidance on air-purifying respirator use.

Escape-only respirators

A medical evaluation is not required for personnel who wear escape-only respirators (or dust masks).



No work can be performed using an escape-only respirator; it is for escape purposes only!

Emergency Respirator Use

The use of a respirator when a hazardous atmosphere suddenly occurs, requiring the immediate use of the respirator to escape from the hazardous atmosphere, to enter the hazardous atmosphere for rescue, to perform corrective action, or to perform some other nonroutine tasks.



Individuals/Positions that are expected to don respiratory protection to respond and take immediate corrective action must always be clean-shaven. See the definition of Emergency Respiratory Use.

Rotating and Reciprocating Equipment

- Startup procedures should be posted on control panels.
- Repair, adjustment or maintenance of unguarded moving parts while in operation is unsafe and should be avoided unless absolutely necessary to accomplish a Supervisor-approved task, such as to observe moving parts.

Note: Equipment operated without guards in place requires specific job safety procedures approved by the site/area supervisor and should follow a task-specific JSA to identify and mitigate associated hazards.



To prevent entanglement and serious injury, long hair and loose clothing must be secured prior to working on rotating and reciprocating equipment!



“This Equipment Starts Automatically” signs must be posted on rotating equipment, as applicable.

Safety Leadership Seminar

- Safety Leadership Seminars focus on the core leadership/culture- building principles expected of L48 field personnel and on-site leaders in terms of mindset, care of the workgroup and familiarity with hazard recognition tools and Learning Organization principles. The seminars also provide a platform for line leadership to teach and demonstrate personal and organizational commitment to safety.
- The minimum attendance and frequency requirements are shown in the table below; these requirements are applicable to work performed under the operational control of ConocoPhillips.
- Individuals will fall into one of three roles:

Role	Description	Frequency
Leaders of On-Site Work	-All L48 employees and contract designees who are leaders of on-site field work. -Contractors that lead on-site field work for L48 and are Leads, Supervisors or Managers.	-SLS Course for leaders – Initial -Repeat Every 3 Years
Field Personnel	-L48 employees, contract designees and contractors who work in the field but are not leaders of on-site work. -Individuals who routinely perform unescorted work on L48 sites. -Occasional workers who work unescorted at least once a year on multiple sites in different areas.	-SLS Course – Initial -Repeat Every 3 Years

Non-Field Personnel	<ul style="list-style-type: none">-Individuals who are visiting or are doing low-risk, short duration work; this includes Engineering and other non-field staff.-Individuals providing emergency response actions.-Anyone who does unescorted work on COP L48 sites less than twice a year.	-SLS is Optional
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*Note: SLS is a six-hour course; Leadership SLS is a two-hour course on the same day and is for leaders of on-site work.

- Seminar registration and attendance shall be managed via the L48 SLS SharePoint site. Contractors should contact their ConocoPhillips representative to register for SLS.
- If an individual needs to work in the field prior to attending SLS, the HSE Orientation covers the individual for up to six months.
- The Superintendent has authority to grant exceptions to SLS attendance on a case-by-case basis for short durations.
- Safety Leadership Seminar instructors are not required to attend the course as a student — they can get credit through any seminar they instruct.

Scaffolding

Competent Person — a person who can identify existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective measures to eliminate the hazards.

Qualified Person — a person with a recognized degree, certificate or professional standing, or with extensive knowledge, training and experience, who has successfully demonstrated their ability to solve or resolve problems related to the engineering, design, construction and use of scaffolding.

The following guidelines apply to scaffolding operations:

- Must be designed by a Qualified Person.
- Must be constructed and loaded in accordance with the design.
- May only be erected, moved, dismantled or altered under the direct supervision of a Competent Person.

- The Competent Person must affix a tag to the scaffold stating it has been erected correctly and inspected.
- Scaffold Tags must have the following information:
 - Inspector name
 - Inspection date
 - Site supervisor name

Green Tag indicates: Ready to use.

Red Tag indicates: Unsafe, do not use.

- Alterations may only be made with the approval and re-tagging by a Competent Person.



No work may be performed from a scaffold until it has been inspected and approved by a Competent Person!

A Short-Service Employee (SSE)

A Short-Service Employee (SSE) is a COP employee, contract designee or contractor with less than six months of continuous experience in the oil and gas industry.

Note: Individual assets may define others as SSE such as those with less than six months in a new position or in the asset.

The following should be completed for employees and contract designees before moving from the SSE program:

- Take COP HSE Orientation.
- Complete Safety Leadership Seminar.
- Training in the following manuals and processes, as required:
 - Personal Protective Equipment
 - Driving Safety
 - Lockout/Tagout & Try
 - Confined Space Entry
 - Working at Heights
 - Lifting Operations
 - Excavation
 - Permit to Work
 - Bypassing Safety Devices
 - Hot Work
 - Hazard Communication
 - Respiratory Protection
 - Hydrogen Sulfide
 - Lone Worker Requirements
- Complete the Personnel Management of Change (PMOC) process.

Other SSE expectations include:

- Wear a green hard hat, or alternative identifier, for a minimum of six months.

Note: Alternatives include brightly colored tape or stickers on the hard hat.

- A mentor should be assigned to each SSE. One mentor may support multiple SSEs.

Contractor SSE expectations include:

- Be identified during every JSA and PIC discussion.
- Identify all high-hazard areas (H₂S, overhead loads, SimOps, etc.) where SSE are not allowed to work.
- No more than 30% of a crew should be SSE without approval from the COP on-site lead.
- Contractors should ensure SSE compliance from all subcontractors.
- Contractors are responsible for maintaining their own SSE program and records.

Signs

There may be four types of signs on many Lower 48 COP locations: Danger, Caution, Safety Instruction or Warning Tags.

- Danger signs are usually red and indicate an immediate danger.
- Caution signs are usually yellow and warn against potential hazards.
- Safety instruction signs vary in design, but always contain instruction for managing hazards in the workplace, (e.g., “Do not enter when lights are flashing.”).
- Warning tags vary in design and are temporary. They alert, warn and convey safety information.



All personnel are expected to obey all signs and tags displayed at their work sites!

Simultaneous Operations (SimOps)

SimOps are when more than one operation occurs on a location at the same time where events of any one operation may impact the safety of personnel or equipment of another operation.

Any time SimOps will take place, the owner of the location shall bring together all stakeholders to discuss their individual work scope and how it could affect others working on location.

SimOps must be classified as JSA SimOps or Controlled SimOps:

- JSA SimOps allows work crews to manage activity in the field for lower-risk activities.
- The leads for each crew on location shall come together to discuss possible conflicting tasks and the order in which work will take place.
- Each contractor or group working on location shall conduct their own JSA specific to their work scope and discuss with others on location.

Controlled SimOps is intended to cover higher-risk activities.

- For the activities listed below, a formal SimOps Plan shall be developed, and a SimOps Coordinator appointed.
 - Drilling, Completions, Intervention or Construction + any other activity except routine Production and Maintenance.
 - Multiple Well Activities on the same well pad.
 - Critical Lift + any other permitted activity.
 - Pressure testing (hydrotest, testing BOP, etc.) + any other permitted activity (Hot Work, etc.).
 - Hydrate Removal + any other permitted activity.
 - Entry into a regulated confined space + any other permitted activity.
 - Hot Tap + any other permitted activity.
 - Use of explosives without RF SAFE System.
- The SimOps Plan should follow the template in Attachment 1 of the SimOps Manual and requires a risk assessment.

Effective communication of the SimOps Plan or SimOps JSA to all employees and contractors working within SimOps work areas can be achieved through a variety of strategies including, but not limited to:

- SimOps coordination meetings.
- Project meetings.
- Pre-start meetings.
- Toolbox meetings and JSA reviews on location.
- Well Handover process.
- Work Permit process.

For work that extends beyond a single shift or workday, include status updates on progress of SimOps as part of daily review or shift change meetings with all relevant personnel on location, including review of risk mitigations in place.

NOTES:

- Whenever possible, efforts (postpone, delay, reschedule, etc.) should be made to minimize the amount of SimOps work conducted.
- Activities conducted on Greenfield Capital Projects sites prior to tie-in or introduction of hydrocarbon can follow other work planning processes.
- At the supervisor's discretion, SimOps can be elevated to Controlled SimOps.
- If SimOps will occur in Lower 48 facilities that fall under the requirements of OSHA Process Safety Management (PSM) or in COP facilities with risk classification of Class A/B and has been addressed in the existing Permit to Work, then it is acceptable to follow the existing Permit to Work document and a formal SimOps plan is not required.

Slips, Trips and Falls

- Use your JSA to identify slip, trip and fall hazards. Refresh the JSA whenever the weather or other conditions change (accumulation of debris, cords, hoses or piping).
- Eliminate or mitigate tripping hazards if possible; otherwise, ensure they are clearly identified.
- Improve site walking and working surfaces by housekeeping, grading or traction treatment:
 - Keep all steps, walkways (including nonslip surfaces) and stairs free of obstruction, tools, grease and oils.
 - Cover or barricade holes in the ground, open trenches, grating or walking surfaces that present a fall hazard.
 - Provide a temporary work platform.
 - Clear pathways of ice, snow and mud or cover them with sand.
- Choose another route with better footing.
- Delay the work if necessary.
- Keep your eyes on the path and choose good footholds.
- Move slowly, and test footholds for balance and traction.
- Avoid carrying or dragging loads on surfaces with poor footing.
- After coming down a ladder or stepping down from equipment, maintain a handhold until you've turned around and examined your walking path.



Never jump! You may land on an uneven surface or off balance!

- Provide and use handrails when stairs include four or more steps.



Keep one hand free to hold on to the handrail when going up or down stairs!

- Wear footwear with good slip-resistant soles. If available, use ice grippers or use other precautionary measures in freezing weather when surfaces could be coated with ice.

Static Electricity

Static electricity can be generated any time liquid or solid substances are flowed, splashed, sprayed or agitated.

The discharge of static electricity (arcing) occurs when another object comes close enough for the charge to “arc” across. The result of the discharge varies from an insignificant physical shock to possible ignition of a flammable gas-air mixture. Static charges need to be controlled to avoid unintended ignition.

Note: Refer to the Grounding section for additional information.

The following practices reduce the hazards of static electricity:

- Use NFPA metal containers when transferring flammable liquids.



Using plastic buckets and containers after their original contents are gone is not allowed!

- When a nonconductive hose is used for transferring fluid, all conductive couplings (end fittings) and components should be bonded and grounded.
- Metal storage tanks must be grounded to an earthen ground.
- Ensure the metal gauge line is touching the thief hatch before lowering the line into the tank while gauging.
- Bond tank trucks to the storage tank before the transfer line is connected. Disconnect the transfer line before disconnecting the bond.
- Synthetic Pipe (plastic, PVC, composites, etc.)
 - When opening synthetic pipe that may contain hydrocarbons, protect against static discharge by

applying a film of water or a wet cloth to the work surface. This prevents buildup of static electricity.



A ground wire on the synthetic pipe will not protect against static discharge!

- Static electricity builds on synthetic pipe by friction, particularly during pipe handling, shipping, installation or when cut by sawing or pipe cutters. The flow of air or gas containing dust or scale through the pipe may also build up significant static charges. This is a potential safety hazard in areas with an explosive atmosphere.

T-Post Drivers

Identify the best tool for driving posts or ground rods using the JSA process.

- The most common tool for driving posts is the simple one-piece manual driver.

Note: It is recommended you use a device that prevents the tool from coming completely off the post while pounding, such as a bolt, integral insert, chain or external clamp.

- Avoid lifting the driver off the top of the T- post before thrusting the driver down to strike the post top.

Note: New T-posts typically have a paint color change near the top of the post which helps the operator see how close to the top they are when lifting the driver.

- Pneumatic and hydraulic drivers are alternatives that don't have the risks of manual drivers. These drivers may have a portable, wheeled power pack or self-contained, propane or gasoline combustion power.

Note: Hydraulic drivers are also available as accessories for loaders and skid-steers.

Temporary Equipment

Any temporary equipment or piping that directly ties into the production process equipment must be subject to the same engineering review, MOC and PSSR processes as permanent additions or modifications prior to introduction to COP locations.

- This includes temporary flowback equipment, choke tees, sand cans, separators, tanks, flares, compressors, meters, regulators, interconnecting piping and any other component of the temporary equipment.

- Rental equipment must be designed, maintained and inspected by the rental company in accordance with industry/matrix standards or recommended practices. Any deviation from this process must be approved by Operations/Functional Management.
- Contractors who bring temporary/rental equipment on location to complete their work scope are accountable and responsible for the operation and maintenance of such equipment unless ConocoPhillips contractually agrees to be responsible.
- A qualified Engineer will be utilized to design and a qualified Electrician to install and/or verify the proper installation of electrical grounding on all applicable temporary equipment.
- This does not apply to temporary equipment (rigs, coil tubing units, wireline units, hot oilers, etc.) which are isolated from the process/pressure loop.

Note: Temporary and Portable Equipment Field Verification Checklists are available in Intellex as tools to help verify general inspection, maintenance and operating practices related to temporary or portable equipment in use at Lower 48 sites. Use of these tools is optional, but highly encouraged.

Unmanned Aerial Systems (Drones)

Unmanned Aerial Systems (UAS), or drones, are defined as any powered or unpowered aerial device that does not carry a human operator. The use of UAS devices provides monitoring, inspection and assessment opportunities utilizing advanced technology within the energy industry.

The BU Manager authorizing the use of a UAS by an employee or external party is responsible and accountable to COP for the UAS operation. All employees are responsible for ensuring the UAS operation is conducted safely, and in compliance with the following:

- Applicable laws and regulations.
- ConocoPhillips Aviation Management Practice.
- ConocoPhillips UAS Operational Practice.
- Requirements of the BU.
- Coordination with HSE and facility personnel.



While UAS (drone) use has become a common hobby, any users of this equipment in the Lower 48 must verify compliance with all applicable requirements. Contact HSE or Aviation for additional information.

Unsecured Object Drops/Shifts/Rolls

- Prior to starting a job, inspect for unsecured objects that can drop, shift, roll, tilt or swing. Pay special attention to unsecured overhead items.
- Never leave an object or tool unsecured if it can drop or shift unexpectedly when a connection breaks, a load moves, a bind is removed or the object or tool is bumped.
- Treat an unsecured object as you would a suspended load by maintaining a 3-foot buffer zone around the sides and a 45-degree angle below the object.
Note: Pipe tripping and other rig floor operations are exceptions to the buffer zone rule.
- Never try to catch a falling or swinging object. Let it come to a complete stop before reaching for it.
- Stay outside of the line of fire in case an object unexpectedly drops or swings.

Vac Truck Operation

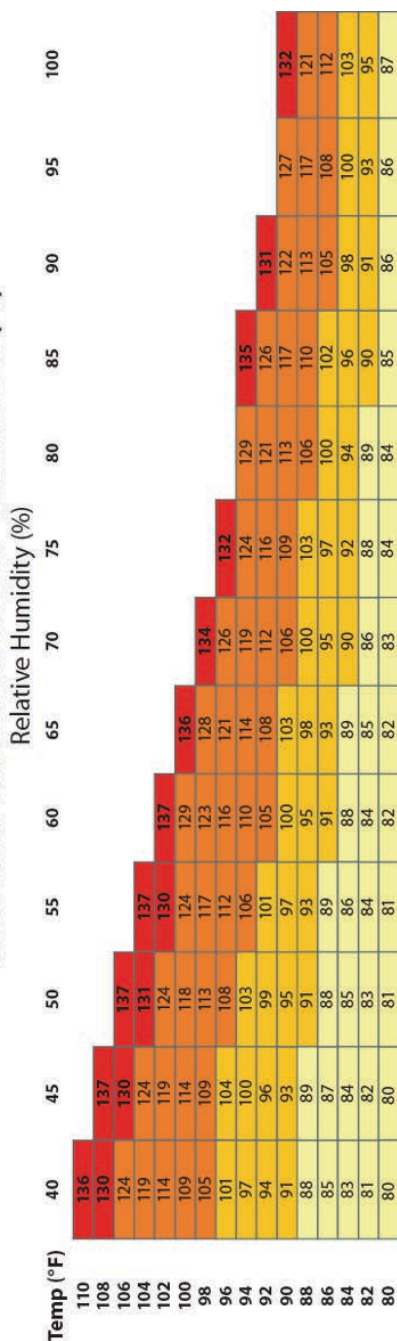
- Vac trucks must NOT be connected to a pressurized system (wellhead, pressure vessel, pipeline, etc.) unless barriers or procedures are in place to ensure the system's pressure cannot overpressure the truck or hoses.
- When parked or working, the vac truck's wheels should be chocked to prevent movement.
- Vacuum trucks must be bonded to storage tanks before the transfer line is connected. Disconnect the transfer line before disconnecting the bond.

Weather

Heat-Related Illness

Use preventive measures to reduce heat-related illnesses when the temperature is above 80°F and refer to the following heat index chart to better understand what workers may be exposed to.

NATIONAL WEATHER SERVICE - HEAT INDEX (°F)



Category	Heat Index	Possible Heat Disorders	Controls
Extreme Danger	130°F or higher	Heat stroke or sunstroke highly likely with continued exposure	Consult IH
Danger	105–129°F	Sunstroke, muscle cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity	PIC/FLM Determination
Extreme Caution	90–105°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity	Buddy System & Direct Observation
Caution	80–90°F	Fatigue possible with prolonged exposure and/or physical activity	Heightened Awareness

To prevent heat-related illnesses:

- Increase your water intake to replace body fluid lost through perspiration and follow the Work Controls outlined in the following table:

Category	Required Cool Water Intake	Required Work Controls
I Caution 80-89°F	16 oz/Hour (8oz/30 min)	1. Address Heat Hazards in JSA. 2. 10-minute breaks recommended every 2 hours (10-2-40).
II Extreme Caution 90-105°F	32 oz/Hour (8oz/16min)	1. Review Heat Hazards (appendix A, C, D, E) in JSA 2. Drink required amount of water each hour during the work day for conditions. 3. Cooling Area Provided. 4. Periodic Supervisor Contact (Face-to Face preferred). 5. Use Buddy System. 6. 10 minute breaks recommended every 50 minutes
III Danger 106-129°F	48 oz/Hour (8oz/10min)	1. Review Heat Hazards (appendix A, C, D, E) in JSA 2. Drink required amount of water for conditions 3. Cooling Area Provided 4. Periodic Face-to-Face Supervisor Contact 5. Re-Evaluate Current work Activates 6. Use Buddy System 7. Consult with Immediate Supervisors to Evaluate 8. 15 minute breaks recommended every 45 minutes
IV Extreme Danger Above 130°F	STOP all Heavy Work Activities Consult with Immediate Supervisor and/or HSE to Evaluate Worksites Heat Exposure Limits	

***Note:** More strenuous activity or heavy clothing/PPE may require more frequent breaks and/or water intake.

The OSHA Heat Safety Tool for iOS and Android can be used to determine heat index and as a reference for symptoms of heat related illness as well as additional preventive measures. The QR code below will take you to the app store, where you can download the app.



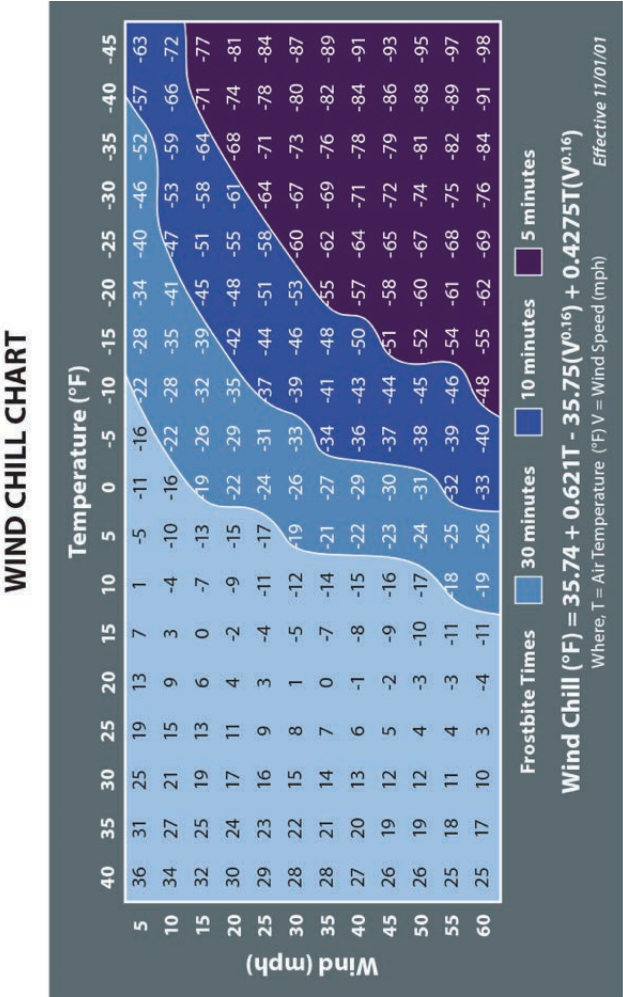
Other considerations for working in hotter temperatures:

- Acclimatize new and returning workers. Allow workers more frequent breaks for a few days while they adjust to the hotter temperatures.
- Eat lighter meals and in smaller quantities.
- Avoid alcohol and caffeine drinks. These increase dehydration. Ensure adequate cool water is easily accessible to workers.
- Take frequent breaks to allow your body to cool off.
- Do outside work during cooler times of the day.
- Slow down your work pace.

- Review importance of hydration, heat illness signs/symptoms, first aid, and summoning of emergency personnel in safety meetings or during JSA discussions.
- Wear appropriate clothing (light-colored clothes).
Note: Ice vests can help workers combat heat stress as well.
- Apply sunblock and wear long sleeves and a hat to protect your skin from sunburn.

Cold Injury Prevention

Cold injury prevention should be considered when you expect the temperature to be below 40°F. Assess work controls in the planning phase and during the JSA. Refer to the following wind chill chart to determine the risk category and implement the recommended work controls.



To prevent injuries due to extreme cold:

- Prioritize and limit outside work during extreme temperature and wind chill days.
- Use the appropriate PPE for any outside work.
 - Pay special attention to your face, head, hands, wrists and feet. 40 percent of your body heat can be lost when your head is exposed.
 - Dress in layers, check weather reports, and have an emergency kit in vehicles (blankets, water, etc.).
 - Recommended PPE includes: a heavy coat or jacket with a hood or a hat that covers the ears, warm gloves and insulated footwear.
 - Ice Gripper cleats are required for walking on icy or otherwise slippery surfaces.
 - Additional winter gear, warming trailers and additional breaks may be needed based on job duties and risk assessment.

Snow and Ice Storms

Personnel are responsible for determining if road conditions are unsafe to travel. A discussion with your supervisor should occur when road conditions are questionable or deemed unsafe.

Lightning

All on-site supervisors should carry a lightning detection device or utilize the weather bug application. In the event the device reaches the “danger” category, suspend work for a minimum of 30 minutes after the last lightning flash.

Note: If no device is available, use the 30-30 rule. If the time between seeing a lightning strike and hearing the thunder is less than 30 seconds, suspend activities for a minimum of 30 minutes after the last lightning flash.

Tornado

In the event of a tornado at a field location, seek shelter immediately in a ditch or other low-lying area. If shelter is unavailable, lie flat on the ground, preferably in a low spot, and cover your head and neck. Once the storm passes, contact your supervisor immediately.

Flooding

Avoid walking and driving through floodwaters. If moving swiftly, even water 6 inches deep can sweep you off your feet. If you come to a flooded area in a vehicle, turn around and go another way. If your vehicle stalls, abandon it immediately and climb to higher ground.

High Winds

Work shall be suspended when wind speeds exceed the manufacturer's recommendation or when the task being performed is unsafe with the current wind conditions. A guideline is:

- 35 MPH* for workover and completion rigs.
- 25 MPH* for mechanical or aerial lifts.

Consider suspending work at heights (tanks and platforms) when high wind conditions are present.

*Equipment manufacturer recommendations, whichever is less.

Welding and Cutting



Welding, torch cutting or soldering in a nondesignated hot work area or where oil or gas vapors may be present requires a Hot Work Permit!



Take necessary precautions to ensure an uncontrolled fire will not occur!



Eye protection required for welding and cutting are tinted lenses shaded to at least 5 or the current OSHA standard to protect your eyes from injury while still providing good visibility of the work!



A face shield with eye protection worn underneath is required for chipping, grinding and wire brushing!

Arc Welding

- Use an adequately rated and insulated electrode holder.
- Protect cables on the floor or ground from becoming damaged or entangled.
- Keep welding cables away from power supply cables and high-tension wires.
- Welding leads should be kept as short as possible. Check for damage prior to each use.

- Repair or replace cables and electrode holders immediately when the insulation is broken.
- Welders should keep their bodies insulated from the work.
Avoid changing electrodes with bare hands or wet gloves when standing on wet floors.
- Grounding attachments:
 - Should be as close as possible to the work.
 - Must be within the area covered by the Hot Work Permit.
- Do not refuel welding machines with the engine running.
- Engine-driven welding machines should be equipped with spark-arrestor mufflers.
- Means for immediate shutdown of welding machines should be readily accessible and clearly marked.
- Proper eye protection must be worn by all personnel welding or working near a welding operation.

Oxygen/Acetylene Cutting

- Keep pressure gauges on cylinders in good working condition.
- When opening cylinder valves, stand to one side of the gauge and open the valve slowly to reduce the possibility of injury if the regulator fails.
- Never use a pipe wrench to open or close a valve; use the special key or wrench attached to the cylinder.
- Close cylinder valves when not in use or left unattended.
- Do not leave a torch unattended in a pipe, vessel or tank. A leaky hose or valve may cause a flammable atmosphere to develop inside the container.
- Protect the valves on compressed gas cylinders with the shipping caps when the regulators are not connected and when transporting the cylinders.
- Tie or chain cylinders in a secure upright position when being hauled, stored or used.

Note: This does not apply to welding trucks.

- Oxygen and acetylene cylinders should be stored at least 20 feet apart or separated by a 5-foot-high firewall with a 1-hour rating.

Note: This does not apply to welding trucks or two-wheeled carts.

- Never use cylinders as rollers.
- Dented cylinders should be taken out of service.
- Never strike an arc on a cylinder.
- Never expose cylinders to excessive heat.
- Keep the space between the cylinders and the job clear so the valves can be reached quickly in an emergency.

- If the hoses catch fire, turn off the supply valves then extinguish the fire.
- Never allow the pressure on the oxygen cylinder to fall below the set (low) pressure on the acetylene cylinder.
- Oxygen cylinders should be removed from service when their pressure drops below 50 psig.
- Acetylene and propane cylinders should be removed from service when their low pressure begins fluctuating. Pressure in the cylinders should not be drawn down less than 5 psig on the high-pressure gauge.
- Do not completely empty a cylinder.
- Never transfer gas from one cylinder to another or mix gases in a cylinder.
- Acetylene reacts with copper and may produce an explosive compound. Do not use copper fittings on acetylene cylinders

Note: Bronze, brass and steel fittings are acceptable.



Oxygen regulator valves, gauges and fittings must not be lubricated with oil or grease, nor should they be handled with greasy hands or gloves as these may cause a spontaneous combustion!

- Never use oxygen for starting engines, equalizing pressure on equipment, blowing dirt from clothing, as a fresh air supply or a substitute for compressed air.
- Use oxygen or acetylene only after verifying that:
 - The bottles are secured in a safe place and the acetylene is in an upright position.
 - Their regulators are equipped with properly operating gauges.
 - A flash-back arrestor is installed on the torch inlet connections.
 - Hoses are leak-free.
 - Hoses are not hanging on or piled close to cylinders when in use.
 - Hoses are turned off at the cylinder valve any time the equipment is not in use.
 - Only friction spark devices are used to ignite cutting torches.
 - Friction spark devices are not carried through a hot work area.
 - When lighting a cutting torch, open the fuel gas valve first, then open the oxygen valve.
 - Keep acetylene pressure downstream of the regulator at or below 15 psi.

Wildlife and Vegetation

Be aware of potential and actual impacts to wildlife near COP operations. Wildlife impacts (including injury, death, and nest or habitat disturbance) may trigger notification and response requirements per applicable regulations, tribal agreements or landowner agreements.

- Avoid interaction and interference with wildlife.



Do not touch or try to capture any wildlife (alive or dead)!

- Use appropriate mitigation methods to prevent on-site or off-site impacts by COP operations.
- Immediately notify a COP supervisor if wildlife is impacted by our operations or if impacted wildlife is found on location.
- The supervisor will contact a COP Regulatory or Environmental representative who will determine required reporting requirements, ensure necessary protocol is followed, file reports and provide further guidance to Operations.

Vegetation

Some plant species are also protected. Prior to performing any surface disturbance (mowing, weed spraying, dirt work, etc.) outside of a developed pad, contact the COP Regulatory or Environmental representative for further direction.

Appendices

Appendix A: Anchor Selection

Anchor Selection Worksheet

Anchor Selection Worksheet					
Pipe, Angle, Beam Width, and Channel Sizing Chart					
Connection Parameters	Required Beam Section Modulus Must Be	Required Pipe Diameter (in.)	Required Angle (in.)	Required Beam Width (in.)	Required Channel Size (in.)
5,000-lb load to the midpoint of bracing spanning less than 5 ft	Greater than 3	Greater than 4 in., Schedule 40	Greater than 6 in. x 6 in. x 3/8 in.	Greater than 4 in. x 13 in.	Greater than 6 in.
5,000 lb load to the midpoint of bracing spanning more than 5 ft and less than 10 ft	Greater than 6.5	Greater than 6 in., Schedule 40	No angles	Greater than 6 in.	Greater than 6 in.
1,000-lb load to the midpoint of bracing spanning less than 5 ft		Greater than 2.375 in., Schedule 40	Greater than 3 in. x 3 in. x 3/8 in.	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 3 in.
Connecting a 3,000-lb load at midpoint of bracing spanning less than 5 ft		Greater than 3.5000 in., Schedule 40	Greater than 6 in. x 4 in. x 1/2 in.	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 4 in.
Connecting a 1,000-lb load at midpoint of bracing spanning more than 5 ft, but less than 10 ft		Greater than 3.5000 in., Schedule 40	Greater than 4 in. x 4 in. x 3/8 in.	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 4 in.
Connecting a 3,000-lb load at midpoint of bracing spanning more than 5 ft, but less than 10 ft		Greater than 4.500 in., Schedule 80 or 5.625 in., Schedule 40	No angles	Greater than or equal to 4 in. x 13 in.	Greater than or equal to 6 in.

Appendix B: Crane Signals

Page 1

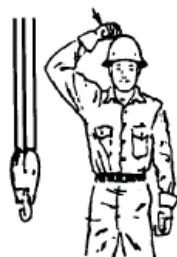
Also Refer to ASME B30.4 and B30.5



HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circles.



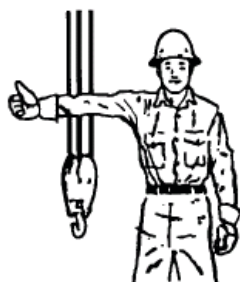
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circles.



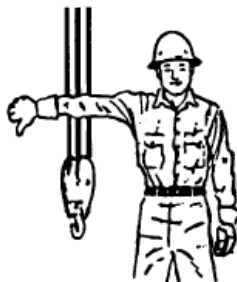
USE MAIN HOIST. Tap fist on head, then use regular signals.



USE WHIPLINE (Auxiliary Hoist). Tap elbow with one hand, then use regular signals.

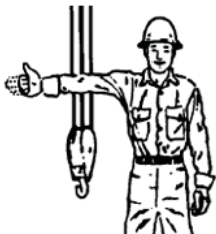









RAISE BOOM. Extend arm, fingers closed, thumb pointing upward.



LOWER BOOM. Extend arm, fingers closed, thumb pointing downward.

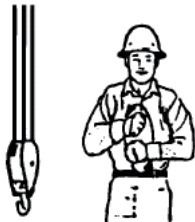





Crane Signals

 <p>RAISE THE BOOM AND LOWER THE LOAD. With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.</p>	 <p>LOWER THE BOOM AND RAISE THE LOAD. With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.</p>
 <p>MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless above hand giving the motion signal. (Hoist slowly shown as example.)</p>	 <p>SWING. Extend arm, point with finger in direction of swing of boom.</p>
 <p>STOP. Extend arm, palm down; move arm back and forth horizontally.</p>	 <p>EMERGENCY STOP. Extend both arms, palms down, and move arms back and forth horizontally.</p>
 <p>TRAVEL. Extend arm forward, hand open and slightly raised; make pushing motion in direction of travel.</p>	 <p>DOG EVERYTHING. Clasp hands in front of body.</p>

Page 2

Crane Signals

Page 3

 <p>TRAVEL (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel, forward or backward (for land cranes only).</p>	 <p>TRAVEL (One Side Track). Lock the track on side indicated by raised fist. Travel opposite track indicated by circular motion of other fist, rotated vertically in front of body (for land cranes only).</p>
 <p>EXTEND BOOM (Telescoping Booms). Hold both fists in front of body, thumbs pointing outward.</p>	 <p>RETRACT BOOM (Telescoping Booms). Hold both fists in front of body, thumbs pointing toward each other.</p>
 <p>EXTEND BOOM (Telescoping Boom). One-hand signal. One fist in front of chest with thumb tapping chest.</p>	 <p>RETRACT BOOM (Telescoping Boom). One-hand signal. One fist in front of chest with thumb pointing outward and heel of fist tapping chest.</p>

Appendix C: Flanges and Flange Dimensions

Dimensions of ANSI B16.5 2003 Class 150

Dimensions of ANSI B16.5 2003 Class 150				
Flanges and Flange Bolts				
Nominal Pipe Size	Number and Diameter of Bolts	Length of Bolts		
		Stud Bolts (1)		Machine Bolts
		0.06-in. Raised Face (in.)	Ring Joint (in.)	0.06-in. Raised Face (in.)
1/2	4 - 1/2"	2.25	-	2.00
3/4	4 - 1/2"	2.50	-	2.25
1	4 - 1/2"	2.50	3.00	2.25
1 1/4	4 - 1/2"	2.75	3.25	2.25
1 1/2	4 - 1/2"	3.00	3.25	2.50
2	4 - 5/8"	3.25	3.75	2.75
2 1/2	4 - 5/8"	3.50	4.00	3.00
3	4 - 5/8"	3.50	4.00	3.00
3 1/2	8 - 5/8"	3.50	4.00	3.00
4	8 - 5/8"	3.50	4.00	3.00
5	8 - 3/4"	3.75	4.25	3.25
6	8 - 3/4"	4.00	4.50	3.25
8	8 - 3/4"	4.25	4.75	3.50
10	12 - 7/8"	4.50	5.00	4.00
12	12 - 7/8"	4.75	5.25	4.00
14	12 - 7/8"	5.25	5.75	4.50
16	16 - 1"	5.25	5.75	4.50
18	16 - 1 1/8"	5.75	6.25	5.00
20	20 - 1 1/8"	6.25	6.75	5.50
24	20 - 1 1/4"	6.75	7.25	6.00
Note(1) Length of stud bolt DOES NOT include height of the points				

Dimensions of ANSI B16.5 2003 Class 300










Dimensions of ANSI B16.5 2003 Class 300 Flanges and Flange Bolts				
Nominal Pipe Size	Number and Diameter of Bolts	Length of Bolts		
		Stud Bolts (1)		Machine Bolts
		0.06-in. Raised Face (in.)	Ring Joint (in.)	0.06-in. Raised Face (in.)
1/2	4 - 1/2"	2.50	3.00	2.25
3/4	4 - 5/8"	3.00	3.50	2.50
1	4 - 5/8"	3.00	3.50	2.50
1 1/4	4 - 5/8"	3.25	3.75	2.75
1 1/2	4 - 3/4"	3.50	4.00	3.00
2	8 - 5/8"	3.50	4.00	3.00
2 1/2	8 - 3/4"	4.00	4.50	3.25
3	8 - 3/4"	4.25	4.75	3.50
3 1/2	8 - 3/4"	4.25	5.00	3.75
4	8 - 3/4"	4.50	5.00	3.75
5	8 - 3/4"	4.75	5.25	4.25
6	12 - 3/4"	4.75	5.50	4.25
8	12 - 7/8"	5.50	6.00	4.75
10	16 - 1"	6.25	6.75	5.50
12	16 - 1 1/8"	6.75	7.25	5.75
14	20 - 1 1/8"	7.00	7.50	6.25
16	20 - 1 1/4"	7.50	8.00	6.50
18	24 - 1 1/4"	7.75	8.25	6.75
20	24 - 1 1/4"	8.00	8.75	7.25
24	24 - 1 1/2"	9.00	10.00	8.00
Note(1) Length of stud bolt DOES NOT include height of the points				

Dimensions of ANSI B16.5 2003 Class 600

Dimensions of ANSI B16.5 2003 Class 600 Flanges and Flange Bolts				
Nominal Pipe Size	Number and Diameter of Bolts	Length of Bolts		
		Stud Bolts (1)		Machine Bolts
		0.06-in. Raised Face (in.)	Ring Joint (in.)	0.06-in. Raised Face (in.)
1/2	4 - 1/2"	3.00	2.75	3.00
3/4	4 - 5/8"	3.50	3.25	3.50
1	4 - 5/8"	3.50	3.25	3.50
1 1/4	4 - 5/8"	3.75	3.50	3.75
1 1/2	4 - 3/4"	4.25	4.00	4.25
2	8 - 5/8"	4.25	4.00	4.25
2 1/2	8 - 3/4"	4.75	4.50	4.75
3	8 - 3/4"	5.00	4.75	5.00
3 1/2	8 - 7/8"	5.50	5.25	5.50
4	8 - 7/8"	5.75	5.50	5.75
5	8 - 1"	6.50	6.25	6.50
6	12 - 1"	6.75	6.50	6.75
8	12 - 1 1/8"	7.50	7.25	7.75
10	16 - 1 1/4"	8.50	8.25	8.50
12	20 - 1 1/4"	8.75	8.50	8.75
14	20 - 1 3/8"	9.25	9.00	9.25
16	20 - 1 1/2"	10.00	9.75	10.00
18	20 - 1 5/8"	10.75	10.50	10.75
20	24 - 1 5/8"	11.25	11.00	11.50
24	24 - 1 7/8"	13.00	12.75	13.25
Note(1) Length of stud bolt DOES NOT include height of the points				

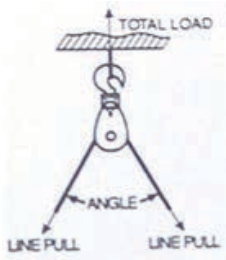
Appendix D: GHS Pictograms and Hazards

HazCom Globally Harmonized System (GHS) Pictograms and Hazards

<p>Health Hazard</p>  <ul style="list-style-type: none"> ■ Carcinogen ■ Mutagenicity ■ Reproductive Toxicity ■ Respiratory Sensitizer ■ Target Organ Toxicity ■ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ■ Flammables ■ Pyrophorics ■ Self-Heating ■ Emits Flammable Gas ■ Self-Reactives ■ Organic Peroxides
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ■ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ■ Skin Corrosion/Burns ■ Eye Damage ■ Corrosive to Metals
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ■ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ■ Aquatic Toxicity
<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ■ Irritant (skin and eye) ■ Skin Sensitizer ■ Acute Toxicity ■ Narcotic Effects ■ Respiratory Tract Irritant ■ Hazardous to Ozone Layer (Non-Mandatory) 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ■ Acute Toxicity (fatal or toxic)
<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ■ Explosives ■ Self-Reactives ■ Organic Peroxides 	

Appendix E: Loads on Blocks

Angle in Degrees	Factor
0	2.00
10	1.99
20	1.97
30	1.93
40	1.87
45	1.84
50	1.81
60	1.73
70	1.64
80	1.53
90	1.41
100	1.29
110	1.15
120	1.00
130	.84
135	.76
140	.68
150	.52
160	.35
170	.17
180	.00



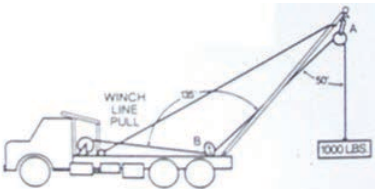
Example: A gin pole truck lifting 1,000 pounds. There is no mechanical advantage to a single part load line system, so winch line pull is equal to 1,000 pounds or the weight being lifted.

To determine total load on snatch block A:

$$A = \begin{matrix} 1,000 \\ \text{(line pull)} \end{matrix} \times \begin{matrix} 1.81 \\ \text{(factor 50-deg. angle)} \end{matrix} = 1,810 \text{ lb}$$

To determine total load on toggle block B:

$$B = \begin{matrix} 1,000 \\ \text{(line pull)} \end{matrix} \times \begin{matrix} 0.76 \\ \text{(factor 135-degree angle)} \end{matrix} = 760 \text{ lb}$$



Appendix F: Rigging Practices, Good and Bad

Use of Chokers



Bad - Because of cutting action of eye splice on running line.



Good - Use Thimbles in the eyes, and no cutting action on running lines.



Bad - Bolt on running line can work loose.



Good - Bolt cannot turn, shackle pin can't turn.

Eye Fittings



Bad Practice - Wire rope knot with dip. Efficiency 50% or less.



Good Practice - Note use of the thimble in the eye splice.

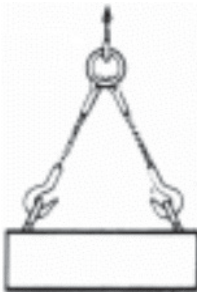


Bad Practice - Thimble should be used to increase strength of eye and reduce wear on rope.



Good Practice - Note use of the thimble in the eye.

Hook Slings



Bad Practice - Hook openings should be turned out.



Good Practice - Hooks are turned out.

Rigging Practices, Good and Bad

Page 2

Wire Rope



Correct Method - U-Bolts of clips on short end of the rope. (No distortion on live end of rope.)



Wrong Method - U-Bolts on live end of the rope. (This will cause mashed spots on live end of the rope.)











Wrong Method - Staggered clips; two correct and one wrong. (This will cause a mashed spot in live end of rope due to wrong position of center clip.)

After rope is in service, and is under tension, tighten clips to take up decrease in rope diameter.

Efficiency of wire rope clip connections is dependent upon turning the rope over a proper size thimble, applying the correct number of clips for the wire rope size and construction, and tightening the nuts to the recommended torque. The user should consult the clip manufacturer's application instructions to obtain this information.

...as compared to Catalog Breaking Strength of Wire Rope:

Figure	Type of Connection	Efficiency
	Wire Rope	100%
	2 Sockets - Zinc Type - Properly Attached	100%
	3 Wedge Sockets	80%
	4 Clips - Crosby Type	80%
	5 Clips - Flat Grip Type	80%
	6 Plate Clamp - Three Bolt Type	80%
	7 Spliced Eye and Thimble	
	1/4 and smaller	100%
	3/8 to 3/4	95%
	7/8 to 1	88%
	1 1/8 to 1 1/2	82%
	1 5/8 to 2	75%
	2 1/2 and larger	70%
	8 Swedge Socket	100%
	9 Swedge Sleeve	100%

Appendix G: Wire Rope and Clips

- Space clips based upon the wire rope size. Each clip should be spaced approximately 6 times the diameter of the rope apart.
- The U-bolt piece of the clip goes on the dead end of the wire rope and the saddle goes on the live end of the rope. Remember this phrase – "Never saddle a dead horse."
- A minimum of two clips is required regardless of wire rope size. The exact number of clips required depends upon the wire rope size, as seen in the table below.

Diameter of Rope (inches)	Number of Clips
3/8	3
1/2	4
5/8	4
3/4	5
7/8	5
1	6
1 1/8	6
1 1/4	7
1 3/8	7
1 1/2	8

- Whenever two or more ropes are to be placed over a hook, a shackle should be used.

Appendix H: Acronym List

Acronym	Description
A&OI	Asset & Operating Integrity
ACM	asbestos-containing material
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ATV	all-terrain vehicle
BBS	Behavior-Based Safety
BBP	bloodborne pathogens
CGP	Construction General Permit
CPR	cardiopulmonary resuscitation
CSE	confined space entry
CU	Captive Unit
CWA	Clean Water Act
CWMP	Commercial Waste Management Program
DOT	Department of Transportation
ESD	emergency shutdown
ESA	Endangered Species Act
EPA	Environmental Protection Agency
HAZMAT	hazardous material
HAZWOPER	Hazardous Waste Operations and Emergency Response
HPD	hearing protection device
HRMW	Hazard Recognition and Management Workshop
HSE	health, safety and environment
IADC	International Association of Drilling Contractors
IATA	International Air Transport Association
ITR	Inspection, Testing and Repair
JA	jurisdictional agency
JSA	Job Safety Analysis
KPI	Key Performance Indicators
LCA	Latent Cause Analysis
LEL	lower explosive limit
LFL	lower flammability limit
LOTO	lockout/tagout
LSR	Life Saving Rule
MAWP	maximum allowable working pressure
MMS	Minerals Management Service
MOC	Management of Change
MODU	mobile offshore drilling unit
MOT	Materials of Trade

Acronym List, *continued*

Acronym	Description
MS	Management System
NFPA	National Fire Protection Association
NORM	naturally occurring radioactive material
OCS	Outer Continental Shelf
OEL	occupational exposure limit
OIM	Offshore Installation Manager
OSHA	Occupational Safety and Health Administration
PACM	possible asbestos-containing material
PEL	permissible exposure limit
PFD	personal flotation device
PPE	personal protective equipment
PSM	Process Safety Management
PSSR	Pre-Startup Safety Review
QMS	Quality Management System
RCFA	Root Cause Failure Analysis
RSO	Radiation Safety Officer
RUST	regulated underground storage tank
RFCM	respirable-fibers-containing material
RQ	reportable quantity
RUST	regulated underground storage tank
PEL	permissible exposure limit
SCBA	self-contained breathing apparatus
SLS	Safety Leadership Seminars
SOG	standard operating guideline
SOP	standard operating procedure
SPCC	Spill Prevention Control and Countermeasure
SSV	subsurface safety valve
STEL	short-term exposure limit
TLWP	tension-leg wellhead platform
TSCA	Toxic Substances Control Act
TWA	time-weighted average
UIC	Underground Injection Control
UL	Underwriters Laboratories
UN	United Nations
USCG	U.S. Coast Guard
UST&V	underground storage tank and vessel
UTV	utility terrain vehicle

Appendix I: GO Card

Lower 48

GO Card

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1. Prepare for the Job

- What is your job task?
 - Have you performed this job task before?
 - What did you learn?
- What is your primary language of communication?
- What is the procedure?
 - What job steps are you going to do?
- Does everyone on location know what you are doing?
 - How does it affect them? How will they affect you? (SIMOPS)
- What tools do you need and how will you inspect them?
- Do we have short-service employees?
 - How are you going to manage them?
- What PPE do you need for this job and do you have it?
 - Have you inspected it?

2. General Hazard Identification

- How are you going to manage the **weather** and your **working environment** (weather changes/what will sting or bite you)?
- What will cause you to **slip, trip or fall**?
- How will you **hurt** your **hands**?

3. CRITICAL HAZARD Identification

- What will seriously **hurt you** or **KILL you**?
- What are you going to do about it? (Critical Controls)
- What will **crush you**? 
 - Where will you be during your work?
- How will you be **hurt by stored energy** (pressure, mechanical, electrical)? 
 - How & where will you release it before starting working?
 - Who verified it is de-energized?
- Where will you **fall from >4'**? 
 - How are you protected?
- Where will **hazardous/flammable gases** be released? 
 - How will you prevent ignition?
 - How will you prevent being **exposed** (H₂S, LEL, Nitrogen)?
- What **permits** are required? 
 - Did the authorized person verify critical controls are complete?
- Any other conditions that could seriously **hurt you** or **KILL you**?
 - Have you identified all the hazards? (Step back, look up, look around.)
 - What defenses have you put in place?

Do you agree? You are ready to go to work.

Refresh with Go Card when job scope changes.

USE YOUR STOP WORK AUTHORITY!

GO Card, *continued*

Life Saving Rules



Keep yourself and others out of the line of fire.



Verify isolation before work begins.



Work with a valid work permit when required.



Obtain authorization before starting ground disturbance or excavation activities.



Obtain authorization before entering a confined space.



Obtain authorization before bypassing, disabling or inhibiting a safety protection device or equipment.



Protect yourself against a fall when working at height.



Follow safe lifting operations and do not walk under a suspended load.

Wear your seat belt, obey speed limits and do not use any mobile device while driving.

Process Safety Fundamentals (PSF)



Use two barriers for hydrocarbon vents and drains.



Walk the line. Verify and validate any line-up change.



Do not leave critical draining and transfer operations unattended.



Know the condition of your safety devices. Risk assess any impairments or deferrals.



Follow an approved change management process prior to altering process systems (even if temporary).



Ensure equipment is pressure-free, drained and properly isolated before starting work.



Verify for complete tightness after installation or maintenance work.



Ensure effective well isolation, with at least two barriers, when working downstream of a well.

Finish Card

1. What went according to plan and what surprised you today?
2. What hazards did you miss and how did you adjust?
 - Stop Work/Near Misses/Good Catches/Observations
3. What did you have to "make do"?
4. Were our **critical controls good enough**?
5. Did you learn anything that should be shared with others?

Appendix J: LSRV, Handbook, and Critical Activities QR

Life Saving Rule Verification Form



Critical Activities Lists



Digital HSE Handbook





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