



NA Gas Onshore US

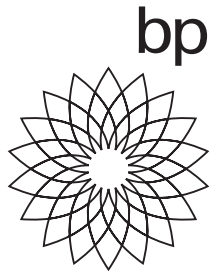
3rd Edition



Health & Safety Handbook
Published Date: August 2007



“Pam Bailey symbolized the dream of all tasks being completed safely and every person returning home safely. She touched each one of us through her work and personal commitment. We are all in a better place today thanks to Pam. This handbook is dedicated to her memory and her incredible passion to protect those around her.”



This handbook belongs to:

Immediate Supervisor:

Health & Safety Representative:

Environmental Representative:

Other Contacts:

INTRODUCTION

The intent of this health and safety handbook is to provide a quick reference for certain safety and health policies and operating practices for personnel working in the BP North America Gas (NAG) SPU Onshore US. As the working environment and regulations change, revisions to this handbook may be required.

BP is committed to maintaining a safe work environment for all personnel. BP requires that contractor companies have their own health and safety programs and expects its contractors to adhere to the most stringent health and safety standards and to comply with all applicable laws and regulations.

Our HSE goals are simply stated:

*"No accidents, no harm to people and
no damage to the environment"*

This fundamental belief is reinforced by BP's Health, Safety, Security and Environmental Policy. The policy follows this introduction to serve as a continual reminder of the importance and commitment the company places on getting HSE right.

For additional information, refer to NAG SPU Onshore US Health and Safety Document References.

RESPONSIBILITIES

People at all levels in the BP organization are expected to be committed to meeting our health, safety, technical integrity and environmental goals and objectives.

Every person working for BP, including contractors, must understand that they have the authority and obligation to stop unsafe work and report any occurrence to their immediate onsite supervisor.



BP U.S. Health, Safety and Environmental Policy

Everybody who works for BP in the United States of America is responsible for getting HSE right. Good HSE performance and the health, safety and security of everyone who works for us are critical to the success of our business.

Our goals are simply stated - no accidents, no harm to people, and no damage to the environment.

We will continue to drive down the environmental and health impact of our operations by **pollution prevention**, reducing waste, emissions and discharges, and using energy efficiently. We will produce quality products that can be used safely by our customers.

We will:

- consult, listen and respond openly to our customers, employees, neighbors, public interest groups and those who work with us
- work with others - our partners, suppliers, competitors and regulators - to raise the standards of our industry
- as a minimum, **comply with all applicable laws and regulations** and any other requirements to which to company subscribes
- openly report our performance, good and bad
- recognize those who contribute to improved HSE performance

We are committed to **continual improvement** of our HSE performance and management systems. Our business plans include measurable HSE targets. We are all committed to meeting them.

Ross Pillari
President, BP America Inc.
May 2002

Jack E. Golden
President, BP Exploration & Production
North America

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Materials contained in this handbook are uncontrolled copies and are only a portion of the complete NAG Health and Safety manual. The complete NAG Health and Safety manual can be found at: <http://naghsse.bpweb.bp.com> and includes, but is not limited to, the following information:

- Forms,
- Permits,
- Checklists,
- Graphics,
- Questionnaires, and
- Subjects not included in this handbook.

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ASBESTOS

Asbestos

ASBESTOS

WHERE IT IS FOUND

Asbestos-Containing Materials (ACMs) were commonly used in the past in pipe wrap and coatings, mastics, gaskets, brake pads, vessel insulation, pipe insulation, fireproofing and building insulation. Asbestos may also be present in miscellaneous materials such as cement-asbestos (transite) panels and pipe, floor tiles and mastics, and roofing felts and mastics. It is very difficult to differentiate between ACM and non-ACM without laboratory testing. Some materials (i.e. cement-asbestos products (transite)) may be Presumed Asbestos-Containing Material (PACM) by governmental agencies such as Occupational Safety and Health Administration (OSHA). BP no longer permits ACM to be installed or used as a building material, although ACM may still be in place where it was previously installed in older facilities.

Job tasks that may be associated with ACM include:

- removal or application of mastics/muds on thermal system insulation,
- removal of gaskets, floor tile, transite, or wall board,
- removal of pipeline coating or insulation,
- renovation or repair of any structure or equipment,
- demolition of any structure,
- maintenance, alteration, or removal of switchgear electrical starter arc chutes manufactured in the 1970's or earlier, and/or
- emergency clean-up of spilled asbestos waste material.

HEALTH EFFECTS

Asbestos has been recognized as a health hazard by regulatory agencies and is highly regulated. However, according to the Environmental Protection Agency (EPA), the presence of asbestos in buildings does not mean that the health of building occupants is necessarily endangered. As long as ACMs remain in good condition and are not disturbed, exposure to asbestos fibers is unlikely. The EPA has stated, "intact and undisturbed asbestos materials generally do not pose a health risk". The potential for exposure exists when the material becomes damaged or "friable" to the extent that asbestos fibers become airborne and are inhaled. Friable is defined as any material containing more than one percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Several types of life-threatening diseases that persons occupationally exposed to asbestos over a period of time may develop include:

- Asbestosis (fibrotic lung disease),
- Mesothelioma (cancer of the chest lining),
- Lung cancer, and
- Pleural plaques.

EXPOSURE LIMITS AND CONTROLS

The OSHA permissible exposure limit is 0.1 fibers per cubic centimeter of air as an 8 hour time weighted average.

The OSHA excursion limit is 1.0 fiber per cubic centimeter of air for 30 minutes.

To minimize personnel exposure, it is important not to sand, grind, abrade, drill, cut, remove, tear, step on, brush against, hammer on, or in any way disturb ACM or PACM. Before performing any work that may disturb unidentified insulating or building materials, BP personnel must first determine whether the material contains asbestos. Only trained and qualified personnel with proper equipment shall disturb or remove ACM. Only non-ACM materials (including gaskets) must be ordered. To protect employees from hazards associated with asbestos during construction and/or maintenance activities, government regulations and standards shall be followed at all times.

Refer to NAG Onshore U.S. Safe Practice Manual for further details on asbestos monitoring, signage, training, work practices and other requirements.



BENZENE

Benzene

BENZENE

WHERE IT IS FOUND

Benzene is commonly found in crude oil and gas operations, and in crude oil products such as diesel fuel and gasoline. Drilling muds returned from oil-bearing formations may carry benzene into the drilling rig. In US North America Gas production facilities, benzene may be present in process streams, gas-drying glycol systems, lube oil of wet gas compressors, storage tanks, epoxy coating operations, produced water systems, and other areas. Benzene levels above the BP action level of 0.5 ppm (parts per million) have been found in some filtering operations at produced water disposal facilities. Exposures above the action level may occur when process equipment is opened for service or when process fluids leak or spill. Consumer products containing benzene include tobacco, gasoline, solvents, adhesives, and varnishes.

HEALTH EFFECTS

Short-term effects of benzene exposure primarily result in depression of the central nervous system. Benzene exposure can occur by inhalation, ingestion, and absorption through the skin. Inhalation of concentrations over 50 ppm can produce headache, exhaustion, weariness, dizziness, drowsiness, or excitation. Exposure to very high levels of Benzene can result in unconsciousness and even death.

Long-term overexposure to benzene has been associated with certain types of leukemia in humans. In addition, the International Agency for Research on Cancer (IARC), the National Toxicology Program, and OSHA consider benzene to be a human carcinogen. Chronic exposures to high levels of benzene have been reported to cause adverse blood effects, including anemia.

EXPOSURE LIMITS AND CONTROLS

The BP US NAG action limit for exposure to benzene is 0.5 ppm. The goal in managing the risk associated with benzene exposure is to use practices which minimize inhalation of hydrocarbon vapors and skin contact and reduce exposure levels in the workplace. This can be accomplished by:

- Requesting benzene monitoring be conducted on any task which the worker feels may have the potential for benzene exposure;
- Flushing and purging of any equipment and vessels prior to being opened;
- Allowing any initial hydrocarbon vapors released to properly vent when opening vessels, (i.e. gauging tanks, process filter changes, etc.);
- Installing temporary local exhaust ventilation to capture hydrocarbon vapors at the source before they reach the worker's breathing zone; and
- Using the proper PPE:
 - Use nitrile or neoprene gloves when skin contact is possible
 - Use a minimum of a half-face respirator with organic vapor cartridges when breathing zone concentrations are above 0.5 ppm benzene.

Refer to NAG Onshore U.S. Safe Practice Manual for benzene monitoring, training and other requirements.

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CONFINED SPACE ENTRY

Confined Space Entry

CONFINED SPACE ENTRY (K0000000438)

1.0 PURPOSE / SCOPE

The purpose of this document is to establish the minimum requirements to safely enter into confined spaces within the North America Gas (NAG) Onshore US Operations.

This document addresses permit-required, alternative entry and non-permit-required confined space entries and is intended to:

- Prevent unauthorized and unintentional personnel entry into a confined space, and
- Confirm safe entry into, and work within, confined spaces by authorized personnel and emergency rescue services.

2.0 DEFINITIONS

Attendant: An Attendant is a BP employee or contract worker and is stationed outside one or more permit spaces who monitors Authorized Entrants and who performs all Attendant's duties as defined in this practice.

Authorized Entrant: An Authorized Entrant is a BP employee or contract worker and is authorized by the Entry Supervisor to enter a confined space.

Competent Person (OSHA): A person who is capable of identifying existing and predictable hazards in the working conditions or surroundings which could be unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Confined Space: A space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
2. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry); and
3. Is not designed for continuous employee occupancy.

Control of Work: Roles and Responsibilities as defined in the NAG SPU Control of Work Policy

Engulfment: The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry: The action by which a person passes through an opening into a confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit (Permit): The written or printed document that is provided to allow and control entry into a confined space and that contains the information specified under Section 5.1.1 of this document.

Entry Supervisor: The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

An Entry Supervisor also may serve as an Attendant or as an Authorized Entrant, as long as that person is trained and equipped as required by this program for each role he or she fills. An Entry Supervisor cannot simultaneously serve in both the Entry Supervisor and Authorized Entrants roles. Also, the duties of the Entry Supervisor may be passed from one individual to another during the course of an entry operation. The Entry Supervisor may be any properly trained personnel.

Entry Supervisors shall certify in writing that all hazards in the permitted space have been eliminated and make this document available to each entrant. This certification shall contain the date, location of the space, and the signature of the Entry Supervisor.

Hazardous Atmosphere: A hazardous atmosphere is an atmosphere that may expose personnel to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from:

- Flammable gases, vapors, or mists above 10 percent of the Lower Explosive Limit (LEL);
- Airborne combustible dusts at a concentration that meets or exceeds its LEL;
- Atmospheric oxygen concentrations below 19.5 percent or above 23.5 percent;
- Atmospheric concentrations containing a toxic substance above the OSHA Permissible Exposure Limit (PEL); and
- Any other atmospheric condition that is immediately dangerous to life or health.

Isolation: The process by which a confined space is removed from service and completely protected against the release of energy and material into the space by such means as:

- Blanking or blinding;
- Misaligning and capping or removing sections of lines, pipes, or ducts;
- Lockout or tagout of all sources of energy; and
- Blocking or disconnecting all mechanical linkages.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s). The JSEA shall be discussed with all personnel involved before Confined Space Entry work begins.

Lower Explosive Limit (LEL): The lowest concentration of an explosive gas in air that will support combustion. Methane has a LEL of 5% at atmospheric pressure and 60° F. As pressure or temperature increases, the LEL will decrease.

Non-Permit Confined Space: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen Deficient Atmosphere: An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen Enriched Atmosphere: An atmosphere containing more than 23.5 percent oxygen by volume.

Permit-Required Confined Space (Permit Space): A Permit-Required Confined Space means a confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere.
2. Contains a material that has the potential for engulfing an entrant.
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

Prohibited Condition: Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

Rescue Service: The personnel designated to rescue personnel from confined spaces.

3.0 GENERAL REQUIREMENTS

3.1 BP Personnel

3.1.1 Each Operating Center Manager (OCM), Wells Superintendent and Major Projects Manager is accountable for implementing and enforcing BP's Onshore US Confined Space Entry Practice.

3.1.2 Each Operating Center's Confined Space Program shall be reviewed at least annually unless no entry is performed within the previous 12 months. Each canceled permit shall be reviewed within one year of its cancellation. Revisions shall be made to the program as necessary to protect personnel from the potential hazards of confined space entries. The annual review of the program (if required) shall also include an on-site evaluation of a confined space entry. Documentation of these reviews shall be maintained for one year.

3.1.3 The site safety personnel shall evaluate the workplace to determine if any spaces are confined spaces.

3.1.4 Personnel shall be informed of the existence and hazards of confined spaces by posting of danger signs or by other equally effective means, such as documented training.

3.1.5 If the work site contains permit spaces, danger signs shall be posted (or other equally effective means) to inform potentially exposed workers of the existence and location of and the danger posed by the confined spaces. Note: A sign reading "DANGER - PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language would satisfy the requirement for a sign. Refer to OSHA 29 CFR 1910.146 (c)(2).

3.1.6 When a location arranges to have contractors perform work that involves confined space entry, the Entry Supervisor shall:

- Inform the contractor that the workplace contains confined spaces and that confined space entry is allowed only through compliance with a permit space program meeting the requirements of BP's Onshore US Confined Space Entry Practice.
- Inform the contractor of the elements, including the hazards identified and the location's experience with the space, that make the space in question a permit space.

- Inform the contractor of any precautions or procedures that the location has implemented for the protection of personnel in or near confined spaces where contractor personnel will be working.
- Coordinate entry operations with the contractor when both the location's personnel and contractor personnel will be working in or near confined spaces.
- Debrief the contractor at the conclusion of the entry operations regarding the confined space program followed and regarding any hazards confronted or created in confined spaces during entry operations.

3.2 Contractor Personnel

In addition to complying with the confined space requirements that apply to BP personnel, each contractor who is retained to perform confined space entry operations shall:

- Obtain any available information regarding permit space hazards and entry operations from the Entry Supervisor.
- Coordinate entry operations with BP personnel when both contractor and BP personnel will be working in or near confined spaces.
- Inform site safety personnel of the confined space program that the contractor shall follow and of any hazards confronted or created in confined spaces, either through a debriefing or during the entry operation.

4.0 KEY RESPONSIBILITIES

4.1 Control of Work Roles and Responsibilities as defined in Section 3.2 of the NAG SPU Control of Work Policy:

- Area Authority (AA)
- Issuing Authority (IA)
- Performing Authority (PA)
- Person in Charge (PIC)

Note: Roles and responsibilities required to operate within the Control of Work Policy and associated procedures shall be identified, communicated and recorded within the local competent persons registry. Consult your local leadership for job specific identified roles.

4.2 Each Authorized Entrant shall:

- Know the hazards that may be faced during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Be properly trained in the tasks and procedures they are required to perform.
- Use equipment properly.
- Communicate with the Attendant as necessary to monitor the status of the space and alert them of the need to evacuate the space.
- Alert the Attendant whenever an entrant recognizes any warning sign or symptom of exposure to a dangerous situation or detects a prohibited condition.
- Exit from the confined space as quickly as possible whenever:
 - An order is given to evacuate by the Attendant or the Entry Supervisor,
 - The entrant recognizes any warning sign of a dangerous situation or symptom of exposure,
 - The entrant detects a prohibited condition, or
 - An evacuation alarm is activated.

4.3 Each Attendant shall:

- Know the hazards that may be faced during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Be aware of possible behavioral effects of hazard exposure to Authorized Entrants.
- Continuously maintain an accurate count of authorized personnel in the confined space.

- Remain outside the confined space and monitors the Authorized Entrants until relieved by another Attendant.
- Communicate with Authorized Entrants as necessary to monitor entrant status and to alert them of the need to evacuate the space.
- Monitor activities inside and outside the space to determine if it is safe to remain in the space and order the Authorized Entrants to evacuate the confined space immediately under any of the following conditions:
 - If the Attendant detects a prohibited condition,
 - If the Attendant detects any behavioral effects of a hazardous exposure,
 - If the Attendant detects a situation outside the space that could endanger the entrants, or
 - If the Attendant becomes unable to effectively and safely perform all the duties required of him or her.
- Summon rescue and other emergency services as soon as the Attendant determines that Authorized Entrants may need assistance to escape from confined space hazards.
- Take the following actions when unauthorized persons approach or enter a confined space while entry is underway:
 - Warn the unauthorized person to stay away from the confined space,
 - Advise the unauthorized person that they shall exit immediately if they have entered the permit space, and
 - Inform the Authorized Entrants and the Entry Supervisor if unauthorized persons have entered the confined space.
- Perform non-entry rescues as specified by the location's rescue procedure.
- Perform no other duties that might interfere with the Attendant's primary duty to monitor and protect the Authorized Entrants.

4.4 Each Entry Supervisor shall:

- Determine if acceptable entry conditions are present at a confined space where entry is planned;
- Complete and discusses a JSEA with all personnel involved in the Confined Space Entry;
- Authorize entry and oversee entry operations;
- Know the hazards that may be faced during entry, including information on how exposure might occur, signs or symptoms of exposure, and consequences of exposure;
- Verify that all tests specified by the permit have been conducted and that all procedures /policies and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- Verify that all persons involved in confined entry are properly trained in their assigned duties.
- Verify that rescue services are available and that the means for summoning them are operable;
- Remove unauthorized individuals who enter or who attempt to enter the confined space during entry operations;
- Whenever responsibility for a confined space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, determine that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained;
- Terminate the entry and cancel the permit when the entry operations specified by the permit have been completed or when a condition not allowed under the entry permit arises in or near the confined space, and
- Be responsible for the Issuance and closure of Confined Space Entry Permits.

5.0 PROCESS

5.1 Permit Requirements

5.1.1 Confined Space Entry Permit templates should be developed at the discretion of each Operating Center. Permit content and design should meet or exceed the expectations of the guidance and instructions within this practice. (See **Non-mandatory 'SAMPLE' Confined Space Permit Form** (K0000001826) located in Section 7.0, Associated Documents/Links Table in the master Confined Space Entry document in the Health & Safety Manual on the web.)

The entry permit shall contain the following information:

- The permit space to be entered;
- The purpose of the entry;
- The date and authorized duration of the entry permit;
- The names of Authorized Entrants by a means that shall enable the attendant to quickly and accurately determine which of the authorized personnel are inside the confined space;
- Personnel, by name, currently serving as Attendants;
- Space for the appropriate signatures that authorize entry;
- The hazards of the confined space to be entered;
- Measures used to isolate the confined space and to eliminate or control permit space hazards before entry;
- Acceptable entry conditions that include the initial and periodic gas tests accompanied by the name(s) of the tester(s) who tested the permit space and surrounding area;
- Rescue and emergency services that can be summoned and the means for summoning those services;
- Communication procedures used by authorized personnel to maintain contact during entry;

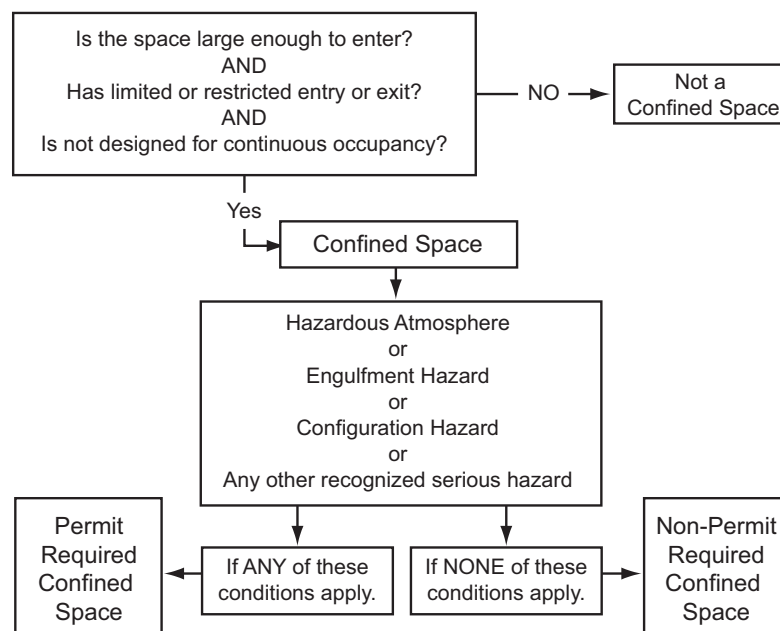
- A list of equipment required, such as personal protective equipment, testing, communications, rescue, and alarm systems;
- Any other information that is necessary, given the circumstances of the particular confined space, in order to confirm personnel safety; and
- The identity of any additional permits, such as for hot work, that have been issued to authorize work in the confined space.

5.1.2 Work in a confined space shall not be allowed until a Confined Space Entry Permit is completed and a Job Safety Environmental Analysis (JSEA) has been conducted. Permits shall have an expiration time and shall not be valid for shifts other than the one in which the work was started.

5.1.3 The completed permit shall be placed in a transparent envelope, a large Ziploc bag, or other protective holder at or near the entrance of the confined space for the duration of the work.

5.1.4 Each Operating Center shall retain each canceled entry permit for at least one year to facilitate review of the permit-required confined space entry program. Reviews shall be retained for one year from the date of the review.

5.2 Confined Space Entry Permit Decision Diagram



5.3 Permit Process

1. Request Permit - Performing Authority (PA) and/or Issuing Authority (IA)
2. Initial Review - Area Authority (AA)
3. Authorize - Area Authority (AA)
4. Permit Issue - Issuing Authority (IA)
5. Permit goes live (Work Execution) Performing Authority (PA)
6. Job Complete - Performing Authority (PA)
7. Permit to Work Complete - Issuing Authority (IA)
8. Work Complete and Permit Closed - Area Authority (AA)

5.4 Preparation for a Confined Space Entry

5.4.1 Before anyone enters the interior of any vessel or tank, it shall be drained, washed, purged, and flushed to the extent practical.

5.4.2 Necessary flanges shall be blinded or all lines that may carry harmful agents disconnected to confirm that no vapors or fluids can leak into the confined space area. Extraneous sources of harmful agents such as sight glasses, level bridges, and gauges shall be disconnected and drained. Double block and bleed to isolate equipment is not sufficient for entry into permit-required confined spaces. Necessary pumps, motors, or any other energy source shall be locked and tagged out to ensure complete isolation of the confined space. Established electrical lockout/tagout and blinding procedures for equipment isolation shall be followed.

5.4.3 The use of purging and mechanical ventilation shall be considered before entering confined spaces unless conditions prevent its use. Ventilation equipment shall be classified for the hazard(s) for the area it will be used in; for example, Class I Division 2 explosive-proof fans may be required if ventilation is used.

5.4.4 Special considerations shall be given to tanks that are being purged with an inert gas. "Normal" combustible gas indicators will not accurately measure the combustible gas in a tank being purged with an inert gas, such as nitrogen. Consult your local Safety Representative for the availability of specialized monitoring equipment.

5.4.5 Portable or fixed danger signs shall be posted at all points of entry to a confined space that may not be safe for unprotected entry or where a hazardous atmosphere may accumulate. Signs shall state: "CONFINED SPACE - ENTRY BY PERMIT ONLY".

5.4.6 To confirm safe entry conditions, the location shall provide, maintain, and properly use the following equipment as required:

- Direct reading gas testing equipment for (a) oxygen content, (b) flammable gases and vapors, and (c) potential toxic contaminants. Questions for measuring toxic contaminants should be directed to your Safety Representative or the NAG Industrial Hygiene Team.
- Any necessary ventilating equipment.
- Communications equipment, as required.
- Any required personal protective equipment such as Self Contained Breathing Apparatus (SCBA).
- Sufficient lighting equipment that is designed for confined space entry to allow for both, safe work and quick exits.
- Barriers and shields necessary to protect workers from external hazards.
- Any needed entry or exit equipment, such as ladders.
- Adequate rescue and emergency equipment to aid in a rescue and offer immediate First Aid and Cardiopulmonary Resuscitation (CPR).
- Any other equipment necessary for a safe confined space entry and in the event that a rescue is required.

5.5 Testing Confined Space Atmosphere

5.5.1 Before entry, the internal atmosphere shall be tested with a calibrated direct-reading instrument at the working level for the following conditions, in the following order:

1. Oxygen content,
2. Flammable gases or vapors,
3. Toxic vapors and gases, and
4. Naturally Occurring Radioactive Material (NORM).

5.5.2 Tests for NORM shall be done before entering a tank or vessel if there are no previous NORM tests on file. The results of these tests shall be retained on file at the appropriate Operating Center. For additional information, contact the Health and Industrial Hygiene Team.

5.5.3 In such instances where entry is required to test the atmosphere, the individual conducting the test shall wear a Self-Contained Breathing Apparatus (SCBA) or airline positive pressure respirator with egress bottle. The Respiratory Protection Program shall be followed when using respiratory equipment.

5.5.4 All equipment used for atmospheric testing shall be calibrated and operationally checked before use according to the manufacturer's specifications. **Note:** the atmospheric tests and operational checks that precede the issuing of a permit shall be done as close as practical to the time the work is to begin and recorded on the entry permit. The following lists actionable levels for these tests:

- The percentage of oxygen for unprotected entry into a confined space shall be no less than 19.5 percent and no greater than 23.5 percent. The oxygen level shall be monitored before the flammability test is conducted.
- Entry shall not be allowed if the LEL is greater than 10 percent.

- Entry shall not be allowed if measurements of toxic materials exceed the OSHA Permissible Exposure Limit (PEL). Questions for measurements of toxic materials should be directed to your Safety Representative or the NAG Industrial Hygiene Team.
- **Direct reading instruments** are the only units approved for confined space entry jobs. Contact your Safety representative with any questions.

5.5.5 Those confined spaces that do not require respiratory protection based on the test results shall be continuously monitored with an oxygen meter during the performance of work. The area shall be evacuated immediately if the oxygen content falls below 19.5 percent by volume if proper respiratory equipment is not being used. The area shall also be evacuated immediately if the oxygen content rises above 23.5 percent by volume.

5.5.6 Continuous monitoring shall also be conducted for toxic gases and combustible gases LEL that may be released during the course of work. Continuous monitoring for toxic and combustible gases is **mandatory** for all confined space work, regardless of the respiratory protection provided. The area shall be evacuated if the combustible gases rise above 10 percent LEL. The area shall be ventilated to confirm that the LEL is at or below 10 percent before re-entry is permitted.

5.6 Rescue and Emergency Services

5.6.1 The following requirements apply to locations where personnel enter confined spaces to perform rescue services:

- The Entry Supervisor shall confirm that each member of the rescue service is provided with, and is trained to properly use, personal protective and rescue equipment necessary for making rescues from confined spaces.
- Each member of the rescue team shall be trained to perform his or her assigned rescue duties and each member shall also receive the training required of Authorized Entrants.

- Each member of the rescue service shall practice making confined space rescues using dummies, mannequins, or actual persons and shall use representative spaces (e.g., spaces with the same configuration, opening size, and accessibility) to simulate the types of confined spaces from which rescue is to be performed. This training shall be completed at least once every 12 months.
- Each member of the rescue service shall be trained in basic first aid and in Cardiopulmonary Resuscitation (CPR). At least one member of the rescue service shall hold current certification in First Aid and CPR.

5.6.2 If the location arranges to have outside persons perform confined space rescue, the Entry Supervisor shall:

- Inform the rescue service of the hazards they might confront.
- Provide the rescue service with access to all permit spaces from which rescue may be necessary so that they can develop appropriate plans and practice rescue operations.

5.6.3 To facilitate non-entry rescue, retrieval systems or methods shall be used, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:

- Each Authorized Entrant shall use a full body harness with a retrieval line attached at the center of the entrant's back, near shoulder level or above the entrant's head. Wristlets may be used in lieu of the full body harness only if the Entry Supervisor can demonstrate that the use of a full body harness is infeasible or creates a hazard and that the use of wristlets is the safest and most effective alternative.

Note: Use of wristlets is the least desirable method of lowering or raising personnel, and shall be considered only in extreme circumstances.

- The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the confined space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type confined spaces more than 5 feet deep.

5.6.4 If an injured entrant is exposed to a hazardous substance, the Material Safety Data Sheet (MSDS) or written information shall be made available to the medical personnel treating the exposed entrant.

5.7 Terminating a Confined Space Entry

5.7.1 The Entry Supervisor shall terminate entry and cancel the entry permit when:

- The entry operations covered by the entry permit have been completed or
- A condition that is not allowed under the entry permit arises in or near the confined space.

5.7.2 Upon termination of entry and cancellation of the Confined Space Entry Permit, the Entry Supervisor shall confirm that:

- Personnel are out of the confined space and accounted for;
- Equipment has been removed from the space;
- Entry portals are restored to operating conditions;
- Inlet and outlet piping is restored to service;
- Safety and automation systems are restored to normal service;
- The Confined Space Entry Permit is removed from the work area;
- Affected personnel (BP and contractors) are debriefed to identify any deficiencies or hazards encountered during the entry. The debriefing and any deficiencies identified shall be documented on the canceled permit for future review.

5.8 Exceptions

There are two exceptions to the required use of the confined space entry permit procedures that are dependent upon the nature of the confined space.

1. Alternative Entry Procedures, and
2. Permit Space Reclassification Procedures (non-permit confined spaces).

5.8.1 Alternative Entry Process

Alternative entry process may be used when the only hazard in the space is a potentially hazardous atmosphere. These are spaces that:

- Do not normally contain a hazardous atmosphere, but that might under certain conditions and
- Personnel may enter periodically.

Examples of situations where alternative entry procedures may be used include, but are not limited to, dike areas, telecommunication manholes and vaults, non-connected tanks, and un-vented valve cans.

If alternative entry procedures are to be allowed, each local Operating Center shall develop specific local procedures including the provisions in this section. Both confined space training for the entrant and documentation of the confined space entry are required.

Conditions to be met to qualify for the alternative entry procedures:

- The only hazard posed by confined space is a potentially hazardous atmosphere.
- Visual inspection and air monitoring tests confirm that the only potential hazard is a hazardous atmosphere.
- Continuous forced air ventilation shall be used.
- If initial entry is necessary to obtain the above data, it shall be performed under the full requirements of a permit-required confined space entry.

Entry shall be in accordance with the following requirements:

- Any condition making it unsafe to remove an entrance cover shall be eliminated before removing the cover. When entrance covers are removed, the opening shall be promptly and effectively guarded.
- Before entry, the internal atmosphere shall be tested with a calibrated direct-reading instrument at the working level for the following conditions, in the following order:
 1. Oxygen content between 19.5-23.5 percent oxygen by volume
 2. Flammable gases and vapors less than or equal to 10 percent of Lower Explosive Limit (LEL)
 3. Potential toxic air contaminants exceeding the OSHA Permissible Exposure Limit (PEL)
- There may be no hazardous atmosphere within the space whenever any employee is inside the space.
- Atmosphere within the space shall be continuously monitored to confirm that ventilation is adequate. If a hazardous atmosphere is detected during entry:
 1. Each employee shall evacuate the space immediately.
 2. The space shall be evaluated to determine how the hazardous atmosphere developed.
 3. Measures shall be taken to protect personnel from hazardous atmosphere before any subsequent entry.
 4. The entrant shall notify a responsible individual that entry is being made and the intended duration of the entry. Upon completion of work in the space, the entrant shall inform the responsible individual that work is complete.

5. Documentation of pre-entry air monitoring shall be maintained for all confined spaces entered using these Alternative Entry Procedures.

5.8.2 Permit Space Reclassification

A permit space may be reclassified as a non-permit space if the following apply and are documented:

- Space may be reclassified for as long as the non-atmospheric hazards remain eliminated if:
 1. There are no actual or potential atmospheric hazards, and
 2. All hazards within the permit space are eliminated without entry.
- Hazards may be eliminated by such actions as purging or inerting tanks/vessels of contaminants, emptying material from hoppers/bins, and using lockout/tagout procedures for electrical/mechanical hazards. The control of atmospheric hazards through forced air ventilation does not constitute elimination of that hazard - it only controls the hazard and a Confined Space Entry Permit shall be used in such cases.
- If entry is required to eliminate hazards, it shall be performed under the full requirements of the permit-required confined space program. The space may be reclassified for as long as the hazards remain eliminated.
- Entry Supervisors shall certify in writing that all hazards in the permitted space have been eliminated and make this document available to each entrant. This certification shall contain the date, location of the space, and the signature of the Entry Supervisor.
- If hazards arise in a reclassified confined space, personnel shall exit and the Entry Supervisor determines whether to continue reclassification of the space.

Note: A combination of reclassification and alternative entry procedures (e.g., using lockout/tagout to eliminate a physical hazard, then continuous forced air to control an atmospheric hazard) shall not be used together. Situations as such shall require a permit before entry.

6.0 TRAINING

For additional training information, refer to
NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

Personnel shall be trained in the relevant aspects of their assigned duties regarding confined spaces when:

- First assigned confined space duties.
- There is a change in assigned duties.
- There is a change in confined space operations that presents a hazard about which an employee has not previously been trained.
- The Entry Supervisor believes that there are deviations from acceptable entry conditions or that an employee demonstrates a lack of training in the confined space entry procedures.

The training shall include, at a minimum:

- Proficiency in the specific duties assigned.
- The type of confined space to be entered.
- Chemical or physical hazards involved.
- Work practices and techniques.
- Atmospheric testing procedures.
- Personal Protective Equipment (PPE) required.
- Rescue procedures.

All training shall be documented and the trainer(s) shall sign the training record. Records should be readily available for review by appropriate personnel.

7.0 KEY DOCUMENTS / TOOLS / REFERENCES

Refer to the master Confined Space Entry document in the Health & Safety Manual on the web.



CONTROL OF WORK

CONTROL OF WORK (CoW) POLICY

1.0 PURPOSE / SCOPE

This Policy applies to North America Gas (NAG) Onshore US and Canada operations. The primary intent of this Policy is to set forth a formal approach for BP employees and contractors to manage risk associated with control of work activities. This Policy also clearly identifies and defines the Person In Charge (PIC) at any particular work site.

This Policy covers the means of safely controlling construction, maintenance, demolition, remediation, operating tasks and similar work activities and applies to the workforce and BP premises. Routine activities, such as taking readings, gauging tanks and operational changes within defined parameters are covered by basic operator qualifications. These routine activities shall be identified by the Operation Center and are outside the scope of this Policy.

In addition, it is the intent of this Policy to promote adoption of like or equal in nature standards, by companies working for BP on non-BP premises. BP will endeavor to hire contractors with Control of Work (CoW) programs that meet or exceed this Policy and will encourage those who do not have such a program to adopt one.

This Policy and all associated Control of Work (CoW) Practices will be issued in accordance with a Document Control Management System (DCMS). Any changes to or proposed deviations from this Policy must be recommended by the Control of Work Technical Authority and approved by the Single Point of Accountability (SPA).

2.0 DEFINITIONS (SEE APPENDIX 1)

3.0 STANDARD REQUIREMENTS

1. A written Policy shall exist describing the Control of Work process.
2. All identified roles within the Control of Work Policy and associated procedures shall have defined accountabilities.
3. All persons involved in the Control of Work process shall be appropriately trained and competent to carry out their roles.

4. Planning and scheduling of work shall identify individual tasks and their interaction.
5. Tasks shall not be conducted without being risk assessed.
6. Before conducting work that involves confined space entry, work on energy systems, ground disturbance, hot work or other hazardous activities, a permit shall be obtained.
7. The scope, hazards, controls and mitigations shall be communicated in writing and signed off by all involved in the task.
8. All ongoing work requiring a permit shall be regularly monitored and managed by a responsible person.
9. The work site shall be left in a safe condition on completion or interruption of work.
10. The Control of Work process shall be subject to a program of regular auditing.
11. Internal and external lessons learned that impact the Control of Work process shall be captured, incorporated, and shared.
12. The Control of Work Policy and associated procedures shall make it clear to everyone that they have the obligation and the authority to stop unsafe work.

3.1 A written policy shall exist describing the Control of Work process.

Intent: To ensure that the Control of Work Policy and associated procedures have been issued in accordance with a Document Control Management System and that any changes or developments are subject to a formal Management of Change control process before authorization and adoption.

3.2 All identified roles within the Control of Work Policy and associated procedures shall have defined accountabilities.

Intent: To ensure that all roles and responsibilities required to operate the Control of Work Policy and associated procedures are identified, articulated to the designated persons and that those persons are competent, authorized and that auditable evidence is available.

3.2.1 BP and contractor employees working on BP Premises will:

- Comply with the Policy.
- Stop the job if it appears potentially unsafe.
- Attend training on the Policy and associated practices/procedures, as appropriate.
- Demonstrate understanding and acceptance of their accountabilities under the Policy.
- Participate in/review Risk Assessments upon request.
- Conduct a site inspection prior to commencing work.
- Assist in the identification of deficiencies in the work process and help identify possible improvements.
- Actively monitor the worksite and surroundings for changes that might impact the performance of the task or affect the safety of those involved in the task.
- Be aware of Emergency Response Plans.
- Report all allegations/occurrences of unsafe work.
- Participate in incident investigations if requested.

3.2.2 Business Unit Leader will:

- Designate the SPA for the Control of Work Policy, and provide the resources necessary to support the implementation of this Policy.

3.2.3 Performance Unit Leaders and Asset Managers and Wells Program Managers will:

- Provide resources necessary to support the implementation of this Policy within their areas of responsibilities.
- Confirm the implementation is completed in their area of responsibility.

3.2.4 Single Point Accountable (SPA) person for the Control of Work Policy will:

- Have ultimate responsibility and accountability for overall performance and content of the Control of Work Policy and associated practices/procedures.

- Be responsible for authorizing and approving changes to the Policy and associated practices/procedures, and for approving all categories of permits, and will confirm that monitoring of compliance with the Policy is occurring under a program of regular audits.
- Access knowledgeable experts within the company as required.
- Have the skills to make decisions in areas of ambiguity and conflict, while maintaining conformance to BP's Core Values.
- Appoint a Technical Authority for the Control of Work Policy (TA/CoW) with the necessary competencies.

3.2.5 Technical Authority (TA) for the Control of Work (CoW) Policy will:

- Supervise the overall implementation of, and conduct operations pursuant to, the Policy.
- Brief the SPA on issues arising under the Policy.
- Recommend proposed changes to the Policy as necessary.
- Be a resource for the NAG SPU in interpreting and answering questions about the Policy.
- Participate in investigation of selected incidents and in the generation of appropriate lessons learned.
- Have Management of Change (MoC) and incident investigation training and experience in the relevant subject matter areas.
- Be a required signatory of MoC's regarding Control of Work to the extent the issues therein do not fall within the domain of another TA.
- Be a coach who will assist Operation Centers (OCs) with continued implementation of the Control of Work process.
- TA/CoW will be registered with the Lessons Learned database and will distribute or advance any necessary changes to the Control of Work program.

3.2.6 Operation Center Managers (OCMs), Wells Team Leaders, and Major Projects Managers will:

- Appoint and maintain an accurate list of Area Authorities (AA), Issuing Authorities (IA) and Performing Authorities (PA). They may be members of BP or contractor work force demonstrating required competencies.
- Provide the resources necessary to implement and operate under the Policy.
- Establish a process that clearly communicates what procedures and policies will be followed for the transfer of Control of Work within work groups (e.g. a board or electronic system showing all work activity for the day).
- Establish a process for identifying a Person in Charge (PIC) of each worksite subject to this Policy.
- Enable the required training and assessments of the AA, IA and PA.
- Be familiar with the intent of the provisions of the Control of Work Policy.
- Confirm processes are in place to provide sufficient resources to carry out the intended scope of work.
- Confirm processes are in place to conduct suitable and sufficient assessment of risk with regard to the health and safety of all involved personnel.
- Be responsible for raising proposed MoC requests to the TA, and for confirming that monitoring and auditing of Policy compliance is occurring as required by the Standard and Policy.
- Be competent in Job Safety Environmental Analysis (JSEA), Risk Assessment, MoC, BP's Golden Rules of Safety, and all associated permit practices.
- Confirm that personnel receive the necessary training and are assessed as competent, and that the Control of Work register is updated as needed.

- Confirm that appropriate lessons learned are captured, incorporated and shared with appropriate OC and BU personnel (BP and Contractors).

3.2.7 The Health, Safety, Security & Environmental (HSSE) Monitor will:

- Conduct assessments/audits and provide documentation as according to section 3.10.
- Review and make recommendations for improvements on the application of the Control of Work Policy.
- Communicate results of assessments/audits to Site and NAG SPU Management.

3.2.8 Area Authority (AA)

The AA is the person appointed by the OCM or Wells Team Leader for confirming all work activities conducted are consistent with the Control of Work Policy and associated practices and permit requirements. In the case of major projects, the Project Manager, in consultation with the OCM or Wells Team Leader, will assign the AA.

The AA will:

- Authorize all work activities within their designated area of responsibility.
- Ensure appropriate permits are issued, closed, and filed per local operating requirements.
- Confirm competencies of BP and contractor personnel performing regular job duties.
- Confirm work is appropriately planned and scheduled
- Identify a Person in Charge (PIC) for each worksite prior to commencement of activity and approve any replacements.
- Assign a competent Issuing Authority (IA) and/or Performing Authority (PA) for each work site and/or activity.
- Confirm competency of the Issuing Authority (IA) and workforce involved in a task consistent with the planned scope of work.
- Confirm with the IA that all appropriate control measures have been, or will be, put in place prior to commencement of activity.

- Require that the IA and site work group perform a Risk Assessment and agree that needed risk mitigation has occurred and that the work can proceed safely.
- Contribute to lessons learned where appropriate to support improvement in the work process or in hazard assessment.
- Be trained as per, Section 3.3, Table 3.3.1.

3.2.9 Issuing Authority (IA):

The IA is the person appointed by the OCM or Wells Team Leader and assigned by the AA for issuing permits consistent with all associated practice and permit requirements. In the case of major projects, the Project Manager, in consultation with the AA, will assign the IA.

The IA will:

- Be responsible for the issuance and closure of permits in their area of competency, e.g., hot work, confined space entry, ground disturbance, lifting, and energy isolation work permits.
- Be on site for permit issuance and then as required by the specific permit practice.
- Review with all site personnel a site-specific emergency response plan.
- Coordinate with the PIC and maintain full knowledge of all work in progress in the area concerned, including any work on the site that is under someone else's authority/control, e.g., SIMOPS.
- Communicate with the AA about the issuance and closure of permits.
- Confirm that all site personnel involved in a work activity are competent and correctly outfitted for the work they will perform.
- Confirm that workers have clear understanding of the scope of work, hazards, controls and mitigations.
- Confirm that the correct tools and equipment are available and appropriate certifications and/or inspections are reviewed or made as appropriate.

- Confirm that required permits are in place and that work undertaken on site is consistent with, and confined to, the original scope of work.
- Prepare lessons learned where appropriate to support continuous improvement efforts and share these with the AA and other personnel as they deem appropriate.
- Be trained as per, Section 3.3, Table 3.3.1.

3.2.10 Performing Authority (PA)

The PA is the person who has been assigned by the AA to be responsible for activities carried out on the work site under the Control of Work Policy and is accountable to the IA/AA for the safe delivery of all work activities. The PA may be performing a task or may be supervising a group that is performing a task. In special cases the PA may also be the IA if competent in the permit practice and requirements in question.

The PA will:

- Confirm that non-essential personnel are kept a safe distance from the work activity.
- Confirm with the oncoming PA that adequate handovers take place at shift and crew change periods.
- Accept and sign authorized permits for work activity being performed.
- Confirm that the following have been clearly established, communicated and understood: a process for the transfer of Control of Work between work groups; what procedures and policies will be followed e.g., what permit tracking system will be used; and who is in charge.
- Participate in the Risk Assessment for the planned activity.
- Confirm, by including in the JSEA discussion, that all persons involved in the task fully understand the scope of the work and the hazards and controls for the job.
- Confirm that all members of the work party sign the permit(s).

- Confirm that only work within the scope of the permit takes place.
- Confirm that the worksite is kept in a clean and safe condition both during and upon completion of the job.
- Observe work activities and if an individual feels that he/she cannot safely manage more than one concurrent task, stop the appropriate portions of assigned work and request assistance from the IA/AA.
- Confirm that appropriate lessons learned from the job are captured, incorporated and shared.
- Confirm all workers involved in the permitted work activity sign JSEA and permit(s) acknowledging their understanding and agreement. In the event that there is more than one work team, there will be representation from each team during the Risk Assessment.
- Be trained as per, Section 3.3, Table 3.3.1.

3.2.11 Person in Charge (PIC):

The PIC is appointed by the AA to be responsible for coordinating among multiple PAs and IAs working at one site to confirm safe delivery of all work activities. The PIC is an onsite individual that has working knowledge of all work activities being performed by all groups/personnel working on location. The PIC can be the AA, IA, or one of the PAs.

The PIC will:

- Function as a liaison between all personnel and groups on location.
- Coordinate any issues that could result in a change in work scope with the AA.
- Confirm that all people working on site have reviewed and signed the JSEA(s) and verified that the appropriate permits have been completed.
- Remain on site until work activities have stopped, permits are closed, and appropriate equipment has been secured for the shift.

3.3 All persons involved in the Control of Work process shall be appropriately trained and competent to carry out their roles.

Intent: To provide assurance that everyone involved with the Control of Work process has the required training and has reached the level of competence required to ensure correct application of the process.

All personnel involved in work covered by this Policy will be trained to the appropriate level. There are three levels of training (refer to Table 3.3.1).

Table 3.3.1 Required Training			
Level	Audience	Initial Training	Refresher Training
Level 1	General workforce in a non-supervisory role	Awareness training (may be part of initial orientation)	Local Decision
Level 2 (See Notes)	AA, IA, PA, PIC, Field Team Leaders, Well Site Leaders, OCMs and Wells Team Leaders.	Minimum xx hours instructor led TBD once the implementation plan has been developed	Once every 3 years
Specialty	AA, IA, PA, PIC as relevant for confirmation of competency in areas of responsibility	JSEA Process, Hot Work, Lifting, Confined Space, Energy Isolation, Ground Disturbance, Hazard Identification Risk Assessment, and Emergency Response	As required by the individual practices and VTA

Note: If a Level 2 trained AA or IA remains on location and physically observes the work being performed, the PA is not then required to have Level 2 training.

Demonstration of Level 2 knowledge will be verified by successful completion of a written exam which must be recorded in Virtual Training Assistant (VTA) Learner to be considered valid.

The refresher period for Level 2 training will be every 3 years. If an individual has not been a member of the BP work force for a period exceeding 3 months the OCM/Wells Team Leader shall assess the need for refresher training before reassignment as an AA, IA or PA.

Additional training is required as identified within the BP permitting practice, e.g. competent person, hot work, confined space entry, ground disturbance.

3.4 Planning and scheduling (P&S) of work shall identify individual tasks and their interaction.

Intent: To ensure that planning and scheduling of work delivers an integrated planning function which accurately reflects the work to be carried out, the use of resources, and the time period required for the safe completion of work.

3.4.1 Planning and scheduling will consider time and resource requirements for hazard identification, Risk Assessment, preparation and planning.

- A documented work planning process must be in place that takes into account the time required for Control of Work activities. In particular, hazard identification, Risk Assessment, planning, scheduling, and preparation must be integral to the work planning process for any activity. This includes the identification of competent personnel and suitable equipment required for safe execution.
- Where necessary the appropriate subject matter experts must be included in the planning stages.
- Job plans will address BP's Golden Rules of Safety to remind personnel of potential safety and environmental risks, permits or authorizations required, and details concerning any of BP's Golden Rules of Safety that may apply to tasks they will be performing.
- When work is dependent on or affects another activity, the planning, scheduling and implementation will be coordinated, and priorities of execution defined.
- Each OC shall establish a plan to manage Simultaneous Operations (SIMOPS).

- SIMOPS will be identified and consideration given to their compatibility.
- Measures shall be taken to mitigate identified risks.

3.5 Tasks shall not be conducted without being risk assessed

Intent: To ensure that a Risk Assessment is conducted and is capable of coping with various levels of complexity, dependant upon the hazards, likelihood of those hazards being realized and the extent of the controls and mitigation needed to ensure that the work can be completed safely.

- The work site will be inspected for potential hazards as a prerequisite for conducting the Risk Assessment.
- The AA and/or PA/IA/PIC will participate in the Risk Assessment and the development of control measures for all work activity.
- Regular tasks may be covered by a procedural approach provided a documented Risk Assessment has been conducted and the associated procedures are controlled and managed within the Document Control Management System.
- Where the Risk Assessment indicates a job-specific Emergency Response Plan is needed, the plan will be in place prior to starting the task. This would usually be done for Type 2 Risk Assessment tasks.
- All equipment/tools used in performing work must be assessed by a competent person as fit for purpose through inspection and/or review of certification.

Risk Assessment Process

The process of Risk Assessment described in this Policy is a method for systematically examining an individual work assignment (task) to identify the hazards, evaluate the risks and specify appropriate control measures.

There are two types of Risk Assessments defined within this process:

Type 1 is a broad overview of the task by a competent person(s), typically the PA and AA, to identify any significant hazards involved and appropriate control measures which are required to be in place to allow the job to proceed. This will be accomplished using the JSEA Process.

Type 2 requires additional assessment, which is initiated when the competent person(s) judges that there are greater hazards or complexities associated with the task which require a more rigorous level of assessment (e.g., permit required activity, working at heights, handling hazardous chemicals, etc).

3.6 Before conducting work that involves confined space entry, work on energy systems, ground disturbance, hot work or other hazardous activities, a permit shall be obtained.

Intent: To ensure that a formal process of "permitting" is utilized for the specific high risk work mentioned above and to allow such work to be safely carried out using the appropriate level of control.

Permits will be issued as identified in the practices that support this Policy.

a. Hot Work Practice

[Onshore US Hot Work Practice](#)

[Onshore US Hot Work Permit](#)

b. Ground Disturbance Practice

[Onshore US Ground Disturbance Practice](#)

[Onshore US Ground Disturbance Flow Chart](#)

[Onshore US Ground Disturbance Permit](#)

[Canada Gas Ground Disturbance](#)

c. Confined Space Entry Practice

[Onshore US Confined Space Practice](#)

[Onshore US Confined Space Permit](#)

[Canada Gas Confined Space](#)

[Currently each Operation Center has an individual Confined Space permit](#)

- d. Lifting Practice
 - Onshore US Lifting Practice
 - Onshore US Lifting Permit
 - Canada Gas Lifting
 - Common NA Gas Onshore US and Canada Gas Lifting Permit (to be issued 2006)
- e. Work on Energy Systems Practice (under development)
 - Onshore US LOTO Practice
 - Canada Gas Energy Isolation
 - Energy Isolation Permit (Under Development)
- f. Canada's Standard Safety Practices Manual

Permit Requirements

Each OC will establish a system that tracks and manages permit open and closure status.

A copy of all permits and associated certificates currently in force must be held at a suitable location (e.g., the control room, the site office, or electronically). If a designated location is not feasible, an individual will be designated as the responsible person to track permit open and closure status.

- The permitting process will provide:
 - A scope of work which defines all tasks and activities which encompass the hazardous activities.
 - Identification of hazards and control measures.
 - Identify isolation of energy sources required to carry out the job.
 - Clear identification of the location and duration of activity.
 - Clear identification of conditions under which the permit(s) becomes void.
 - Specify those carrying out the work and verify that the risks and control measures have been communicated to them.
- The permit(s) will reference and be consistent with the Risk Assessment performed.

3.7 The scope, hazards controls and mitigations shall be communicated in writing and signed by all involved in the task.

Intent: It is vital for the safe execution of work that everyone involved is acquainted with the identified hazards, likelihood of those hazards being realized, and the controls and mitigation actions which have been applied in order to reduce the possibility of an incident or accident.

At least one person at each work site will have the skills and competency to identify the required work scope, hazards, controls and mitigation measures. All site personnel involved in the work activity must confirm in writing their understanding of the scope, hazards, controls and mitigations by signing the JSEA and/or required permits, acknowledging and documenting their understanding and agreement.

Any significant change in job scope must be approved by the AA.

All persons performing work at remote or isolated work sites shall have the skills and competency to identify the required work scope, hazards, controls and mitigation measures. They must establish and maintain regular communications and validate permit requirements with another competent person.

3.8 All ongoing work requiring a permit shall be regularly monitored and managed by a responsible person.

Intent: To protect those completing the work, it is essential that competent persons regularly visit and inspect the work site to ensure that the conditions detailed on the permit have not been compromised: that only the work as described on the permit is carried out and that the work is continuing in a safe manner.

- All permit required activity will be monitored by the PIC.
- In the event of an unplanned shutdown, unplanned interruption of work or change in operating conditions that imposes new hazards or increases risks, all permits are void. Prior to restarting work, the PA must

re-evaluate the job to confirm that work can progress in a safe manner and must work with the IA to re-issue required permits.

- Permits will be valid for no more than a single shift or continuous job.
- At shift change, sufficient time must be set aside to discuss the work status from the technical, safety, and environmental point of view. The original permit will be reviewed and closed and the incoming IA must issue a new permit before work can recommence.
- In the event of a change in AA, the incoming AA will review and fully understand existing permits and ongoing work activity.

3.9 The work site shall be left in a safe condition on completion of activity or interruption of the work.

Intent: On completion or interruption of any work activity, it is essential that prior to the permit being closed, the work site be visited by a competent person to ensure that no potential sources of accidents remain and that the equipment can be safely brought back into service without incident.

- The PIC will confirm that the worksite is left in a clean and safe condition.

3.10 The Control of Work process shall be subject to a program of regular auditing.

Intent: In order to maintain a consistently high standard of Control of Work process application, it is essential that a program of regular auditing be established. The audits should review and make recommendations for improvements on the correct application of the Control of Work process, including all documentation, controls, training and competency. Any discrepancies noted should be communicated to the site and business management with a requirement that corrective action plans are developed and actions are closed out in a timely manner.

The NAG HSSE Monitor Advisor(s) will be responsible for establishing and implementing a regular program of auditing of the Control of Work process, including: individual permits, the Control of Work documentation processes and procedures, and use and application. Audit results will be communicated to the site and business management and reviewed by the Control of Work TA and SPA. Appropriate action will be taken based on audit findings.

Each Operation Center will be responsible for conducting required regulatory audits of the permitted activities associated with Control of Work in their area. In addition to regulatory required audits, each Operation Center will establish a process for completing internal audits of the Control of Work program in their area at a minimum of every three years. All site-specific findings will be managed at each Operation Center. Any findings that have an impact on the NAG Control of Work Policy, Practices or Processes will be communicated to the Control of Work TA for review and appropriate action.

All Control of Work audits and actions will be documented and tracked for completeness closure in Traction.

3.11 Internal and external lessons learned that impact the Control of Work process shall be captured, incorporated, and shared.

Intent: To ensure that any learning's on how to improve the Control of Work process and the safe means of carrying out work are made available to and used by all facilities across the BP Group.

- Significant Control of Work incidents will be investigated and lessons learned will be communicated in accordance with the "NA Gas Initial Internal Incident Reporting, Investigation and Tracking" Practice
- Control of Work TA will be registered with the Lessons Learned database and will distribute or advance any necessary changes to the Control of Work program.

3.12 The Control of Work policy and associated procedures shall make it clear to everyone that they have the obligation and authority to stop unsafe work.

Intent: To stop the continuation of potentially unsafe work at the earliest stage possible by making every member of the workforce responsible for its prevention.

- All personnel must be made aware (e.g., orientation, JSEA, hazard recognition training, etc.) of their obligation to stop work that they consider to be unsafe.
- All reports from personnel that the work is unsafe must be respected, recorded, properly investigated and if warranted, communicated throughout the workforce.

APPENDIX 1 - DEFINITIONS

Accountable Person: The person in the organization who has ultimate responsibility.

Activities: Specific actions or pursuits (See operating tasks).

Assess: To consider and make a judgment upon.

Auditing: A formal or official examination and verification. The audit process should include monitoring, review, and reporting of the outcome of the audit to those people who can implement any changes needed.

Authority:

- a) Official permission.
- b) A position that has the power to make a judgment; an individual cited or appealed to as an expert.
- c) The power to influence or command.

BP Company: A company in the BP Group, or a company or other legal entity where BP has operational control, is responsible for HSSE and has the right to impose this Standard.

BP Employee: A person employed by a BP Company.

BP Operations: BP Business Units, projects, facilities sites and operations.

BP Premises: Any site, location, or marine vessel that is owned or operated by or for a BP Company.

Competency: The ability to perform a task in the correct manner with the correct understanding and reasoning behind the task.

Competent Person: A person who has demonstrated that they have the knowledge, training and experience required to perform the defined role to the standard required.

Confined Space: A confined space is one that is large enough for personnel to enter, has limited or restricted means of entry, and is not designed for normal or continuous occupancy. It can be any enclosed or partially enclosed space where there is a risk of death or serious injury from hazardous substances or dangerous conditions (e.g. lack of oxygen).

Contractor Employees: Members of the workforce employed by and working on behalf of a Contractor.

Contractors: Members of the work force who are not directly employed by BP.

Control:

- a) A mechanism used to regulate a physical process or activity.
- b) An action to mitigate risk.
- c) The power to direct (usually through authority).

Document Control Management System

(DCMS): An established means of controlling the issue, use and updating of documents used in the management of a site. A full DCMS will include reference numbers on documents, means of tracking changes and updates and regular audits of the system to confirm compliance.

Emergency Response: Guidelines for initial responses to an incident that are based on the type of activity or product involved in an incident.

Energy Systems: Systems which by their nature contain energy, e.g., hydraulic, mechanical, electrical, chemical, thermal, potential and pneumatic.

Essential Personnel: Personnel whose direct involvement with work site activities is required.

Formal: A formal process or agreement is one that is written, recorded and audited. It may also include tracking to ensure that work is following the process or agreement.

Ground Disturbance: Work that involves a man-made cut, cavity, trench or depression formed by earth removal, or driving piles into the earth surface.

Hazards: Equipment, materials, activities, or conditions that have a significant potential to cause injury.

Hot Work: Work which involves either the use or the possible creation of a flame, spark or high energy discharge that could act as the ignition source for a fire or explosion.

Interaction: Acting upon each other.

Interruption: The actual definition of work interruption may be different at each site, but could include coffee, smoke breaks and lunch breaks, fire alarms, suspension of work overnight, emergency situations and shift changes.

Lone Worker: a person whose activity requires them to work or travel alone, at or to a site, in circumstances when they cannot be seen or heard by another worker, they cannot expect a visit from another worker for some time and when assistance is not readily available in the event of an injury, illness or emergency.

Management of Change: An established means of managing and controlling changes within an organization.

Mitigation: An action or event which prevents or minimizes the effects of an incident or condition.

Monitoring: The routine function of regular inspection carried out by a responsible and competent person.

Non-Essential Personnel: Are those who do not have an active role in accomplishing the task or activity at hand. e.g., employees who are not Essential Personnel, land owners, third parties, visitors and delivery drivers.

Operational Control: Where BP has responsibility for the activity as owner or under a contractual obligation with the owners of the entity and, as a consequence, has appropriate authority to manage directly all HSSE aspects of the operational activities to meet BP policy and expectations.

Operating Tasks: Tasks carried out by personnel who run BP facilities and production units which require interface with plant and equipment and are necessary to ensure ongoing plant operations (e.g. sample taking, filter element replacement, etc).

Permit: A formal and detailed document containing location, time, equipment to be worked on, Hazard identification, mitigation/precaution measure used, naming those authorizing the work and those performing the work.

Planning and Scheduling (P&S): A systematic process of identifying and listing work and determining when such work will be carried out.

Plan: The function of task (work) identification, interaction and sequencing including, preparation and completion requirements, to achieve an outcome.

Policy: Plan of action pursued by the Company (BP) with which all personnel must comply.

Practice: A technical document on a high risk activity that states minimum expectations and operating requirements for a specified activity or task. A Practice provides practical guidance on ways to control and achieve a reduction or elimination of a health and/or safety risk.

Procedure: A detailed document either in paper or electronic form which sets out sequential or parallel actions which shall be followed by those engaged in carrying out an activity.

Process: A detailed description of a management system or a production operation.

Regular: An activity that is required to take place regularly will be defined by the site and should cover the normal, typical, activities and explain the frequency of that work. Regularly is used to indicate activities that must occur frequently enough to ensure the on-going safety of the work force. For some activities this might be annually, for others it could be every few minutes.

Remote Location: A location that is apart, secluded or isolated from another space or area. An area that is not easily accessible and is not expected to be visited by another worker in the immediate future. (A remote location does not have to be far away, certain process areas that are rarely used can be considered remote or isolated.)

Responsible Person: A suitably trained and experienced individual who has been formally assessed as competent and has been given specific actions or areas of responsibility by an accountable person.

Requirements: The activities, tasks or deliverables that must be completed to comply with the Mandatory Requirements

Risk: Possibility of loss, injury, damage, or exposure to hazard or danger.

Risk Assessment: The process of hazard identification and the assessment of the potential for identified hazards to be realized in any given activity.

Roles: The documented description of personnel functions within a management structure.

Routine: A procedure that does not vary in its execution.

Scheduling: The systematic identification of activities into a time based work flow process.

Shift Change: A period of time during which one work shift stops working and another commences.

Simultaneous Operations (SIMOPS): Separate activities or works, taking place at the same time with the potential to impact on each other.

Single Point Accountable: The person in the organization (site/Business Unit) who has been appointed as being accountable for the delivery and performance of an activity.

Subject Matter Expert: An acknowledged expert in a particular field.

Suspension: Temporary removal, withholding or postponement.

Task Risk Assessment: A means of identifying work related hazards, assessing the possibility of those hazards being realized and defining the mitigating actions and controls required to reduce the risk.

Technical Authority: A person responsible for confirming the accuracy and integrity of technical content and changes.

Training: The bringing of a person to a desired degree of proficiency in some activity or skill. Training should only be carried out by people who have been assessed as being competent to train.

Task: An activity in support of a piece of work.

Virtual Training Assistant (VTA): A computer based training management tool that lists, tracks and delivers training to individuals.

Work: An activity made up of a number of different tasks.

Workforce: BP employees and every employee of any other company or other legal entity that has been engaged to perform work on BP Premises.

Work Planning: A systematic process of identifying and listing work and determining when such work will be carried out.

Worksite: The location of the activity, work or tasks.



DRIVING SAFETY

DRIVING SAFETY (K0000000488)

1.0 PURPOSE / SCOPE

The purpose of this document is to establish a formal approach to managing driving risk for North America Gas (NAG) Onshore US personnel. The further intent is to recommend that a comprehensive Driving Policy be adopted by Non-BP Companies whose employees are members of the BP workforce. Successful implementation should result in fewer driving related incidents, injuries and fatalities. Adherence is mandatory for BP employees, as is compliance with applicable laws and regulations. Failure to comply shall subject BP employees to the NA Gas SPU Disciplinary Policy.

2.0 DEFINITIONS

Affected Vehicle:

- Any company vehicle assigned to a BP employee or any pool vehicle when used by a BP employee.
- Any personal vehicle used on BP company business with operating expenses reimbursed by BP.
- Any rental or leased vehicle used by a BP employee on company business.
- Non-reimbursable commuting is excluded.

Driving Time: The time a driver spends driving a vehicle on BP business, whether the vehicle is in motion or not. This excludes any time spent operating other functions of the vehicle, e.g., loading, unloading and work breaks.

Heavy Vehicle: Any vehicle greater than or equal to 3.5 ton of fixed chassis or articulated trailer, excluding mobile plant.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s). The JSEA shall be discussed with all personnel involved before work begins.

Light Vehicle: Any vehicle less than 3.5 ton excluding mobile plant.

License: A documented, personal identification authorizing the named person to drive designated classifications of vehicles on stated on-road or off-road locations.

Process Equipment and Piping: Includes well heads, vessels (e.g. separators, treaters, dehydration units, and etc.), and production tanks that contain flammable liquids and gas and in-plant/facility piping systems.

Professional Driver: Any heavy vehicle driver, bus driver or chauffeur, and any light vehicle driver who drives more than 16,000 kilometers (10,000 miles) per year on business (or pro-rata mileage for any part of a year) and is thereby regarded as having driving as a core competency as part of their job. A mobile plant operator who as part of their job drives for more than 15 percent of working hours (or pro-rata time for any part of the year) is deemed to be a professional driver.

Vehicle Incident: Any unplanned incident involving:

- All Motor Vehicles - includes heavy vehicles (3.5 tonnes and heavier), light vehicles (under 3.5 tonnes), self-propelled mobile plant. This includes accidents when using a hire/rental vehicle on company business, or when using a private vehicle on company business for which a member of the workforce is reimbursed.
- **Serious Vehicle Accident (SVA):** A vehicle accident involving one of the following shall be classified as a SVA:
 - > \$10,000 damage, or
 - Involving a recordable injury, or
 - Vehicle rollover, or
 - Resulting in a BP work force or third party vehicle that cannot be driven from the scene.

Working Hours: All paid hours on BP business, inclusive of work breaks.

3.0 GENERAL REQUIREMENTS

Group Standard - Personal Safety - Driving Safety (Edition 2)

3.1 Vehicle Requirements:

- The vehicle shall be fit for purpose, and shall be maintained in safe working order, with seatbelts installed and functional.
- The number of passengers shall not exceed manufacturer's specification for the vehicle.
- Loads shall be secure and shall not exceed the manufacturer's specification and legal limits for the vehicle.

3.2 BP Driver Requirements:

- Drivers shall be appropriately assessed, licensed, trained, and medically fit to operate the vehicle.
- Drivers shall be appropriately rested and alert.
- Drivers shall not use a mobile phone or other two-way communication device while operating the vehicle.
- In higher risk countries, risks of the journey shall be assessed and journey risk management policy and plans shall be created and in place.
- Seatbelts shall be worn by all occupants at all times whenever a vehicle is in motion.
- Drivers shall not be under the influence of alcohol or drugs, or any other substance or medication that could impair their ability to drive.
- Safety helmets shall be worn by rider and passengers on all terrain vehicles (ATV), snowmobiles and similar types of vehicles.

4.0 KEY RESPONSIBILITIES

4.1 Local HSE Representative

- Confirm that affected drivers are scheduled for training within six months of first driving on BP business and that refresher training, as required, is received thereafter. Update driving training records in the VTA Database.

4.2 Local VDR Administrator shall:

- Maintain vehicle and driver data within the VDR database;
- Maintain QA/QC data acquired by VDRs to confirm download and frequency accuracy;
- Provide VDR orientation and training to new and transferred employees;
- Provide report orientation to new and transferred supervisors;
- Interact with VDR vendor for repairs and replacements; and
- Compile and distribute driver performance reports to the leadership team as required on a regular basis (e.g. monthly).

4.3 NAG SPU VDR System Administrator shall:

- Develop and maintain BU reports within the VDR database;
- Provide VDR orientations to new/transferred Houston based employees and new local VDR administrators;
- Compile and distribute driver performance reports to the leadership team as required on a regular basis (e.g. monthly); and
- Coordinate BU issues with local system administrators and VDR vendor.

4.4 BP employees who operate company vehicles shall:

- Inspect the vehicle before each use to confirm it is in proper working condition, and
- Promptly report any malfunction or problem with the vehicle to the supervisor.

4.5 BP employees who operate any vehicle on BP business shall:

- Inspect the vehicle before each use to confirm it is in proper working condition,
- Be responsible for completing required training, and
- Advise supervision and/or the Local HSE Representative of any medical, physical, or psychological condition that would impair his/her performance of driving tasks.

4.6 Operational Department Heads and Supervisors shall:

- Confirm that BP personnel, including new employees and transferees, are trained and qualified to operate the class of vehicle that they are required to operate. This includes fatigue training for professional drivers;
- Confirm that professional driver(s) are assessed for pre-hire/selection and medically assessed with a minimum follow up every three years to confirm that they have the functional capacity to operate a vehicle safely. When there is doubt that a potential driver has passed the screening assessment, the individual should be referred to an appropriate registered health professional for a full assessment of the issue(s) raised;
- Confirm that drivers' licenses are checked annually and maintain documentation to confirm this;
- Confirm that vehicles purchased by the company meet the BP Group Minimum Vehicle Specifications;

- Confirm that manufacturer's recommendations for vehicle maintenance of BP-owned or leased vehicles are being met and maintain documentation to confirm this
- Confirm that appropriate emergency response equipment is selected and supplied in each BP owned or leased vehicle; and
- Enforce the NA Gas Onshore US Driving Safety Policy.

4.7 Professional Driver shall:

- Be responsible for obtaining/maintaining appropriate licenses to operate the type(s) of vehicle(s) to which the employee is assigned;
- Be responsible for completing driver training covering the type(s) of vehicle(s) the employee operates, including attachment of trailers (where appropriate), prior to operation of any BP owned or leased vehicle;
- Advise supervision or the Local HSE Representative of any medical, physical, or psychological condition that would impair his/her performance of driving tasks;
- Inspect the vehicle, including any attached trailers and hitching devices, before each use to confirm it is in proper working condition, and
- Promptly report any malfunction or problem with the BP-owned vehicle to the supervisor.

4.8 BP Medical shall:

- Participate in the development of medical assessment guidelines to confirm that drivers have the functional capacity to operate a vehicle safely;
- Provide assistance to the Operations Centers in implementing the medical assessment guidelines and referring individuals who have not passed the medical assessment to an appropriate registered health professional for a full assessment of the issue(s) raised, and
- Participate in the development of fatigue training to confirm that professional drivers have training to identify and reduce the impact of fatigue.

4.9 Human Resources

- Responsible for assisting field management with the application of disciplinary consequences and the processing of affected employees who cannot pass the medical assessment.

4.10 Houston Supply Chain Management shall:

- Confirm that vehicle management company's specifications are aligned with BP Group Vehicle Safety Features, and
- Work with Legal to incorporate the NA Gas SPU Driving Policy into new and existing contracts.

5.0 PROCESS

5.1 Vehicle Requirements

Vehicles shall be fit for purpose and maintained in safe working order, with seatbelts installed and functional.

5.1.1 Vehicle Equipment

All BP-owned or -leased vehicles must have attributes and features specified and installed so that they comply with the respective minimum specifications. Vehicles must be selected and purchased as "fit-for-purpose", confirming proper equipment and meeting a minimum set of safety specifications. Refer to BP Group Light Vehicle Safety Features.

Where applicable, equipment changes shall follow the Management of Change process. Original equipment vehicle manufacturers may be consulted to determine the appropriate manufacturer options and proper aftermarket outfitting for the vehicle's specified service.

It is highly encouraged that personal vehicles used on company business have the attributes and equipment recommended in the "Light Vehicle Safety Features". Whenever a personal vehicle is not equipped with the minimum safety features, it is highly recommended that an alternative be utilized. These may include rental cars, limousines, BP pool vehicles, etc. Supervisory approval should be obtained prior to exercising alternative approaches.

All vehicles, both company owned and leased and personal vehicles used on company business should be maintained according to the manufacturers' recommendations. Whatever the service interval or service method chosen, appropriate documentation must be maintained, either by BP or the vehicle owner. This documentation may include, but is not limited to, service records, lubrication receipts, or maintenance checklists.

5.1.2 Emergency Preparedness Equipment

Each Operation Center shall determine the appropriate emergency equipment for the respective area (e.g., cell phones, radios, fire extinguishers, flares, cold weather gear, SCBA, first aid kit, etc.) and confirm that all BP vehicles contain the appropriate equipment.

5.1.3 Radar detectors are strictly prohibited.

5.1.4 Vehicle Data Recorder

All owned or leased BP NAG vehicles shall be equipped with a Vehicle Data Recorder (VDR) able to record the following minimum data: speed, harsh acceleration, harsh deceleration, and driving hours. A proactive process of capturing and analyzing behavior data shall be implemented and used.

5.1.5 Operations and Maintenance

The person assigned to a BP vehicle and the person assigned to the OC pool vehicles is to confirm that vehicles are operating properly and maintained in accordance with the manufacturers' recommendations and are in compliance with all regulatory requirements (e.g., state annual inspections). "Vehicle Inspection Checklist", or equivalent, shall be documented quarterly. Inspection records shall be maintained for a minimum of three years.

5.1.6 Passengers

- The driver is responsible to confirm that there are no passengers riding in the back of trucks and there are no more passengers in a vehicle than there are seat belts for.

- **The number of passengers will not exceed the manufacturer's design specification for the vehicle.**
- Unless approved by management, passengers other than BP personnel are not allowed in company owned or leased vehicles.

5.1.7 Loads shall be secure and shall not exceed manufacturer's specification and legal limits for the vehicle.

Loads must be secured and not to exceed manufacturer's specifications and legal limits for the vehicle. Vehicles shall be equipped with only necessary equipment, laid out or positioned in a safe configuration. Where applicable, equipment changes shall follow the Management of Change process. Loads, equipment and other items shall be tied down or secured before commencing motion and total weight should never exceed the weight limitations of the vehicle. Load Binder Policy shall be referenced prior to the utilization of load binders.

5.2 BP Driver Requirements

5.2.1 Drivers shall be appropriately assessed, licensed, trained, and medically fit to operate the vehicle.

Driver/Operator License/Certifications: All drivers of Affected Vehicles must possess a valid driver's license for the class of vehicle operated from the state or province where they reside. All operators of specialty vehicles (e.g. forklift, backhoe, bobcat, maintainer, front-end loader, etc.) must possess the appropriate regulatory required certifications.

Drivers of Affected Vehicles shall be required to submit a license to their supervisor initially upon hire. Local supervision shall conduct periodic (minimum of annual) checks of license validity of employees with an assigned company vehicle or employees who may drive a pool vehicle. The retained records should only indicate employee name, expiration month and year and the name of the person conducting the check. Individual license numbers should not be a part of this record. These

records shall be retained in a secure manner, equivalent to all other sensitive employee personal data. These checks shall be documented and retained for the current year.

Drivers of BP-owned or leased vehicles must notify their supervisor if their license is suspended or revoked. Operation of a motor vehicle to conduct company business shall be prohibited until the license is reissued.

Drivers of Affected Vehicles must follow any restrictions imposed upon a license (e.g., corrective lenses, weight restrictions, etc.)

OC personnel and project management shall conduct periodic checks of specialty certifications of equipment operators.

Drivers require a commercial driver license for:

- A single vehicle with a gross vehicle weight rating (GVWR) of more than 26,000 pounds.
- A trailer with a GVWR of 10,000 pounds when the combined weight of trailer and pull vehicle exceeds 26,000 pounds.
- A vehicle designed to transport more than 16 persons (including the driver).
- Any size vehicle which requires hazardous material placards. Any vehicle transporting greater than 119 gallons or 1000 pounds of non-bulk hazardous material or a Table 1 hazardous material (49 CFR 172.101-102) or greater than 882 lbs in weight in a container larger than 119 gallons and is in solid form.

Note: State requirements may vary. Always check local requirements.

Driver/Operator Training: All BP personnel who drive while conducting BP business are required to successfully complete a BP approved driving safety course and assessment within six months of first commencing driving on BP business, and refresher training/assessment must be completed at least every three years thereafter.

BP employee Professional Drivers must attend an approved 8-hour driving safety course and BP approved driver tiredness/fatigue awareness training.

Where assessments identify higher risk drivers, the business is responsible for confirming retraining and reassessment before the individual is allowed to drive on company business.

Driving Assessments: Professional drivers shall have successfully completed an on-road driving assessment as part of their recruitment/selection.

Medical Assessments: Professional Drivers must be medically assessed. A minimum follow up frequency of every three years is required to confirm that they have the functional capacity to operate a vehicle safely. This shall be accomplished and documented when a driver successfully completes the Driving Assessment part of their training. If they do not pass their Driving Assessment because of a functional limitation, they shall then be referred to BP Westlake Medical for a full evaluation. If a change in their medical condition occurs that affects their ability to drive, they must immediately inform their supervisor and cease operating a vehicle until medically re-assessed. BP Medical is accountable for defining the parameters of the medical assessment and responsible, along with local supervision, for coordination of these activities. The respective state Division of Motor Vehicles' assessment made during driver license acquisition/renewal constitutes the medical assessment for non-professional drivers.

5.2.2 Drivers shall be appropriately rested and alert.

Fatigue and Tiredness: Every BP employee is expected to stop driving if they are tired or fatigued. They should either make alternative travel arrangements or have an appropriate period of rest/sleep before driving.

Working Hours: Business Segments, Functions and Regions must confirm that reward mechanisms do not provide an incentive for Professional Drivers to drive excessive hours, which could lead to them driving whilst tired or fatigued.

Fatigue Training: All BP Professional Drivers shall attend a BP approved fatigue awareness training program within six months of commencing driving on BP business. Records of this training shall be maintained in VTA.

The following minimum requirements for working and driving hours should apply to BP employee Professional Drivers driving on BP business:

Requirement	Rule
Maximum <u>working hours</u> within a rolling 24 hour period	16 hours total
Maximum <u>working hours</u>	60 hours/rolling 7 day or 120 hours/14 days, subject to an 80 hours/7 days maximum <u>and</u> an average of 60 hours per week over an extended period.
Maximum <u>driving time</u> within a rolling 24 hour period	10 hours total excluding commuting driving time
Work breaks (including meals) during a working shift	Minimum of 30 min break after every 5 hrs
Off-duty period per rolling 7 days	Minimum of a continuous 24 hour break

In order to comply with the requirements of this element, there should be auditable evidence that BP drivers do not exceed the minimum requirements for working and driving hours for BP drivers. Driving time records and schedule should be maintained for each vehicle operator.

5.2.3 Vehicle Data Recorders

The use of Vehicle Data Recorders (VDR) is required for all of Exploration and Production vehicles, regardless of vehicle size or driver status.

All owned or leased BP vehicles shall be equipped with a Vehicle Data Recorder (VDR) able to record the following minimum data: speed, harsh acceleration, harsh deceleration, and driving hours. A proactive process of capturing and analyzing behavior data shall be implemented and used.

5.2.4 Drivers shall not use a mobile phone or other two-way communication device while operating the vehicle.

Mobile phones or two-way radios may not be used by the driver while the vehicle is in motion, except as required by regulation (e.g., when moving oversized loads in a convoy with escort vehicle(s)). This includes hands-free devices and applies to:

- BP mobile phones and two-way radios in any vehicle
- Personal mobile phones and two-way radios in affected vehicles
- Personal mobile phones and two-way radios on BP business in any vehicle
- Personal mobile phones and two-way radios while on BP owned or leased property

Passive listening and response to operational emergencies using two-way radios is allowed, as supported by the local documented risk assessment for these circumstances. Operational emergencies comprise those situations that expose operational activities to immediate danger or require immediate attention due to significant adverse business impact.

5.2.5 In specific higher risk countries, risks of the journey shall be assessed and journey risk management policy and plans in place.

In NAG, pre-trip risk assessments and route planning activities are encouraged in order to minimize driver hazard exposure. Drivers are responsible for challenging the necessity, frequency and/or extent of trips with the intent to limit hazard exposure. Refer to "Onshore US Pre-Trip Assessment Guidance".

5.2.6 Seatbelts shall be worn by all occupants at all times whenever a vehicle is in motion.

The driver must confirm that seatbelts are worn by all occupants when a vehicle is in motion. In addition, certain mobile plant vehicles (e.g., forklift, backhoe, bobcat, maintainer, front end loader, utility vehicles) must have seatbelts worn while in operation. Excluded are occupants of vehicles that are not normally or not required to be equipped with seat belts, such as: mass transit buses, ATVs, golf carts and snowmobiles.

Taxis and buses/coaches not fitted with seatbelts should only be used where no alternative exists. When contracting for group transportation, identify those companies who have or are willing to fit seatbelts and utilize them to provide transportation.

5.2.7 Drivers shall not be under the influence of alcohol or drugs, or any other substance or medication that could impair their ability to drive.

Substance Abuse - Employees are prohibited from operating an Affected Vehicle while under the influence of drugs or alcohol. Employees must notify their supervisor when using prescription or over-the-counter medications that advise against operating a vehicle and/or equipment. All BP employees involved in a BP recordable vehicle incident shall be subject to a drug and alcohol screen per BP Drug & Alcohol policy, when determined that the employee's actions contributed materially to the incident.

5.2.8 Safety helmets shall be worn by rider and passengers on all terrain vehicles (ATV), snowmobiles and similar types of vehicles.

The use of motorcycles on NAG business is strictly prohibited.

5.3 Other Requirements

5.3.1 Unattended Vehicles:

The parking brake must be engaged and the automatic transmission placed in park anytime a vehicle is left unattended, regardless of whether the engine is idling or shutdown. In the case of vehicles with manual transmissions left idling in neutral, set parking brake and place wheel chocks in front and rear of at least one drive wheel. Vehicles with manual transmissions left unattended while the engine is off must be parked with the transmission in its lowest forward gear or in reverse gear and with the parking brake set.

5.3.2 Clear Path of Travel Review:

Prior to each operation of a vehicle the driver shall confirm that there are no obstacles in the intended path of travel before proceeding.

5.3.3 Parking:

Drivers must assess hazards and park in a manner or area that is legal and minimizes risk. Parking shall be done in a manner that avoids backing upon exit of parking space unless prohibited.

5.3.4 Backing:

Is to be avoided when practical. Drivers shall park in spaces where they can legally drive forward when leaving; otherwise they shall back into the parking space upon arrival, unless prohibited. A spotter shall be used to assist the driver during backing operations of heavy vehicles and should be considered for light vehicles.

5.3.5 Movement of Vehicles on Drilling Wells Operations (DWOP) Facilities & Sites:

Backing is to be avoided where possible. Drivers shall park in spaces where they can legally drive forward when leaving, otherwise, they shall back into the parking space upon arrival. All movement of Heavy Vehicles and Light Vehicles with trailers within the boundaries of the aforementioned facilities and sites shall be performed under the control of vehicle spotters. Where spotters are not available, the drivers shall use traffic cones as guides to assist them in positioning their vehicles.

5.3.6 Trailer Towing:

If a trailer must be towed, the driver must conduct a pre-trip safety inspection of the trailer and vehicle. All federal, state and local requirements for towing shall be followed. A task specific JSA must be conducted. Refer to "NAG SPU Pre-Trip Assessment Guidance".

5.3.7 Vehicle Towing:

Vehicles must be towed by competent personnel, using a vehicle and/or equipment (e.g. tow bar, dolly, etc.) designed specifically for towing applications. The pulling force shall not exceed towing gear/equipment manufacturers' specifications. Straps and/or chains shall not be used for towing activities.

5.3.8 Vehicle Extraction:

Constant tension shall be applied to the tow strap and it shall never be "jerked". Only equipment designed for extraction activities shall be utilized. A task specific JSEA must be conducted.

5.3.9 Personal Use:

BP vehicles may be used for personal use only with prior authorization by local management.

5.3.10 Fueling Vehicle:

Static electricity, non-intrinsically safe devices, spills, and health exposures (breathing and skin) are of concern while fueling vehicles. Refer to "Safe Fueling Guidance". Filling fuel cans in the truck bed is prohibited.

5.3.11 Daytime Running Lights:

To be more visible on the road, daytime running lights are required. If daytime running lights are not available, the vehicle can be retrofitted with an after market kit or headlights must be manually turned on while driving during daylight hours.

5.3.12 Affected Vehicle Incidents:

Drivers are responsible to report all Affected Vehicle incidents (on-road and off-road) to their immediate supervisor as soon as possible. Concern for personal safety should be the first priority. Motor Vehicle Incidents shall be reported, classified, recorded and investigated per the "NA Gas SPU Initial Incident Reporting, Investigation and Tracking Process".

5.3.13 In the event of a vehicle incident, VDR and mobile phone records shall be reviewed as a part of the local incident investigation.

5.3.14 Operation of Vehicles in Proximity to Hydrocarbons Processing Equipment:

Motor vehicles may not be operated within ten (10) feet of hydrocarbon containing process equipment and piping unless a hot work permit has been issued. Operating Centers shall develop specific local procedures for vehicle entry into plants and field facilities.

The above requirement does not include:

- Refueling operations
- Buried equipment

Additional site-specific exceptions may only be allowed by utilizing the MoC process.

5.3.15 Deviations from the Policy or Driving Safety Standard:

Deviations from the requirements of the NA Gas SPU Driving Safety Policy or from the Group Driving Safety Standard are not allowed without a written MoC document approved by the local Operations Center manager and endorsed by the appropriate Asset Manager. Deviations may be precipitated by circumstances where legal regulatory or local conditions in a location or region make adoption infeasible.

The MoC document should delineate the deviation from the Policy or Standard, the reasons that make adoption infeasible, the steps that are in place to mitigate the risk posed by not adopting the Policy and the duration that the deviation shall remain in place.

All deviations must be listed on the annual Segment HSSE report.

5.3.16 Operation of Radio Transmitting Devices in proximity to Perforating Operations:

Radio frequency transmitting devices shall not be operated within 250 feet of all types of perforating detonators. This equipment can include On Star equipped vehicles (or a similar technology), two-way radios both vehicle mounted and hand-held, cell phones, wireless computers, satellite phones, two-way pagers, Blackberry devices, and all similar devices.

6.0 TRAINING

Refer to [NAG SPU Training Website](http://hsetrain.bpweb.bp.com)
(<http://hsetrain.bpweb.bp.com>)

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Driving Safety document in the Health & Safety Manual on the web.



FALL PROTECTION REQUIREMENTS

Fall Protection

FALL PROTECTION (K0000000450)

1.0 PURPOSE / SCOPE

The purpose of this document is to establish the minimum requirements to safely work at heights within the North America Gas (NAG) Onshore US Operations.

Tasks which fall under OSHA's construction standard (CFR 1926.501) require a Fall Prevention System or a Personal Fall Arrest System when a person has the potential to fall 6 feet or greater.

Tasks which fall under OSHA's general industry standard (CFR 1910.23) require that guards or protective measures are in place if there is a drop of 4 feet or more from: holes in walls or floors; chute wall openings; window wall openings at a stairway landing, floor, platform or balcony; temporary wall openings; open-sided floor or platforms; or runways.

In all cases where work is being conducted above dangerous equipment such as moving parts, sharp edges, and regardless of distance between the worker and the equipment, safeguards shall be in place to protect workers from falls.

2.0 DEFINITIONS

Anchorage: A secure point of attachment for lifelines, lanyards or deceleration devices.

Body Harness: Straps which may be secured about a person in a manner that will distribute the fall arrest forces over a large part of the body (e.g., thighs, pelvis, waist, chest and shoulders), with means for attaching the harness to other components of a personal fall arrest system.

Competent Person (OSHA): A person who is capable of identifying existing and predictable hazards in the working conditions or surroundings which could be unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Connector: A device that is used to couple (connect) parts of the personal fall arrest system and the positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

Deceleration Device: Any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyard, automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest or otherwise limit the energy imposed on a person during a fall arrest.

Deceleration Distance: The additional vertical distance a falling person travels (excluding lifeline elongation and free fall distance) before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of a person's body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the person comes to a full stop.

Failure: Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength of any component of the system is exceeded.

Free Fall: Refers to the portion of a fall before a personal fall arrest system begins to apply force to arrest the fall.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s). The JSEA shall be discussed with all personnel involved before work begins.

Lanyard: a flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting a body harness to a deceleration device, lifeline, or anchorage.

Lifeline: a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Low-slope Roof: a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Lower Levels: those areas or surfaces to which a person can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Mechanical Equipment: all motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.

Opening: a gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which a person could fall to a lower level.

Personal Fall Arrest System (PFAS): a system used to arrest the fall of a person in a fall from a working level. It consists of an anchorage, connectors, and a body harness and may also include a lanyard, deceleration device, lifeline, or suitable combination of these. **The use of a body belt for fall arrest is not acceptable.**

Positioning Device System: a body harness system rigged to allow a person to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Rope Grab: a deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of a person. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

Self-retracting Lifeline/lanyard: a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snap Hook: A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap hooks are generally one of two types:

1. A locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
2. A non-locking type with a self-closing keeper that remains closed until pressed open for connection or disconnection. **The use of a non-locking snap hook as part of personal fall arrest systems and positioning device systems is prohibited.**

Toe Board: a low protective barrier that prevents the fall of materials and equipment to lower levels and provides protection from falls for personnel.

Unprotected Sides and Edges: any side or edge (except at entrances to points of access) of a walking/working surface (e.g., floor, roof, ramp, or runway), where there is no wall or guardrail system at least 39 inches (1.0 m) high.

Walking/working Surface: any surface, whether horizontal or vertical, on which personnel walk or work, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel, but not including ladders, vehicles, or trailers, on which personnel must be located in order to perform their job duties.

3.0 GENERAL REQUIREMENTS

3.1 All personnel on a walking or working surface with an unprotected side, edge, or hole shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

3.2 All personnel shall be protected from falling into an excavation, pit, and shaft or well by the use of guardrail systems, barricades, or personal fall arrest systems when the hazards are not easily seen because of plant growth or other visual barrier or when the person is required to work at the edge of the hazard.

3.3 All personnel working above dangerous equipment shall be protected from falling into or onto the dangerous equipment by the use of guardrail systems, barricades, or personnel fall arrest systems or equipment guards.

3.4 All workers shall be trained in the proper use of safety body harnesses, lanyards, lifelines and other fall protection equipment prior to use.

3.5 Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a Competent Person to be undamaged and suitable for reuse.

3.6 Work situations where fall protection is required include, but are not limited to, the following:

- When working on suspended scaffolds.
- When work takes place immediately adjacent to dangerous equipment or processes (e.g., open tanks, or chemical baths), regardless of height.
- When working on or accessing any rooftop.

- On scaffolds or elevated walkways with incomplete decking or handrails.
- When using any type of ladder as a work platform (Note: this does not apply when simply using a ladder to move or climb from one level to another).
- When working from personnel platforms or man lifts.

4.0 KEY RESPONSIBILITIES

4.1 Person In Charge (PIC) Shall:

- Verify that onsite personnel are properly trained in fall protection prior to working in areas requiring fall protection.
- Confirm that onsite personnel have appropriate fall protective devices and equipment when working that requires fall protection.
- Confirm that the requirements identified in this document are adhered to.
- Verify that the Job Safety Environmental Analysis (JSEA) properly identifies fall hazards and that mitigation steps are in place that comply with the requirement set forth in this document.
- Confirm that harnesses, fall arresters and other fall protective equipment meet the requirements identified in OSHA 29 CFR 1926.502 and in Section 5.0 of this document.
- Confirm personnel working at heights understand all fall protection requirements as they apply to the job being performed.
- Confirm personnel use fall protective equipment in the manner for which it is designed.

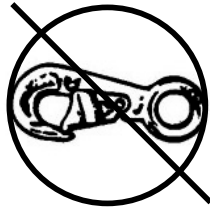
5.0 PROCESS

5.1 Selection of Safety Body Harnesses and Lanyards

- a. Only full body harnesses shall be utilized and rated for the employee's weight.
- b. Lanyards shall be the shock absorbing type. A double or "Y" lanyard that allows for 100% tie off is required.
- c. All components of fall protection equipment shall be capable of withstanding 5,000 pounds breaking strength without cracking, breaking or resulting in permanent deformation.
- d. Buckles must hold securely without slippage or other failure.
- e. Lanyards should be secured above the waist or overhead whenever possible to minimize actual fall distance.
- f. Wire rope cannot be used for lanyards because it does not stretch, thus it does not have sufficient energy absorbing capability.
- g. Only double lock snap hooks shall be used to minimize the potential for "roll out" (See illustrations in Section 5.2).
- h. Lanyards and lifelines shall be kept free of knots.
- i. Any lifeline, body harness or lanyard actually used to arrest a fall shall be immediately removed from service and discarded or recertified by the manufacturer.
- j. Lanyards shall always be manufacturer assembled and never "home made".

5.2 Lanyard Illustrations

Single and double lock snap hooks:



"Old style" Single Lock Hook
(Do not use)



Double Lock
Snap Hook

5.3 Fall Protection Planning and Inspection

- a. Pre-use and annual inspections shall be conducted in accordance with Manufacturer's recommendations. A Competent Person shall conduct an annual inspection and the user shall conduct a pre-use inspection. A component with any defects shall be withdrawn from service, and shall be tagged or marked as unusable, or destroyed.
- b. The annual inspection should be documented and filed at the Operating Center for a minimum of one year. Documentation of pre-use inspections does not require to be documented.
- c. A Competent Person shall be responsible to assist with the development of the appropriate Fall Protection requirements for the task/job to be performed and shall have the final decision on fall protection requirements.

5.4 Horizontal and Vertical Lifelines for Anchor Point Connections

- a. Horizontal lifelines shall be designed, installed, and used under the supervision of a Competent Person, as part of a complete Personal Fall Arrest System (PFAS).
- b. Each horizontal lifeline shall have a minimum breaking strength of 5000 pounds and each worker shall be attached to a separate lifeline.

5.5 Rescue Plan & Resources

- a. The Person in Charge (PIC) shall confirm that personnel can be promptly rescued or can rescue themselves should a fall occur. In some situations, equipment which allows personnel to rescue themselves after the fall has been arrested, such as devices which have descent capability should be used.
- b. The availability of rescue personnel, ladders, or other rescue equipment shall be evaluated during the job planning stage.

6.0 TRAINING

Refer to NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Fall Protection document in the Health & Safety Manual on the web.



**GROUND DISTURBANCE,
EXCAVATIONS, TRENCHING
AND SHORING**

Ground Disturbance

GROUND DISTURBANCE, EXCAVATIONS, TRENCHING AND SHORING (K0000000456)

1.0 PURPOSE / SCOPE

This practice establishes minimum Ground Disturbance requirements for all North America Gas (NAG) Onshore US personnel involved with ground disturbance activities as defined in this document. The scope of this document is intended to include 3rd Party activity within the BP Right of Way or near any BP pipelines or facilities. Operating Centers may deem it necessary to have more stringent requirements in place for specific tasks, based on past work experience and hazard assessments.

2.0 DEFINITIONS

Ground Disturbance: Any excavation, construction or other activity that results in penetration of the ground.

Blind Sweep: The Search Area will be electronically swept using four separate "grid patterns" (e.g., North - South, East - West, NW - SE, and NE - SW) using a locator capable of detecting unknown metallic objects.

Competent Person: Each Onshore US Operations Center (OC) shall designate individuals (employee or contract) who are capable, through experience and/or training, to identify existing and predictable hazards in the surroundings or working conditions which are hazardous or dangerous to personnel and who has authorization to take prompt corrective measures to eliminate such hazards. The primary responsibility for ensuring a safe excavation and/or ground disturbance as defined by this procedure is assigned to the "Competent Person". Competent Person shall demonstrate competency by means of a written evaluation. The OC shall maintain a list of Competent Persons.

Contact: A puncture or crack in the facility, scratch, gouge, flattening or dent of the surface, or, damage to the protective covering.

Depressurization: Reducing the pressure on a line or piping system to 0 psig or as close to that pressure as is reasonable and practical.

Dig Zone: The area of ground to be disturbed.

Encroachment: Crossing or paralleling within 10 feet of an existing line.

Excavation: Any man-made cut, cavity, trench or depression in the earth's surface, formed/caused by earth removal.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s). The JSEA shall be discussed with all personnel involved before Ground Disturbance work begins.

Potholing: Using a safe means of exposure (e.g., hand digging or using a vacuum excavator to make a hole that confirms the exact location, depth, orientation and line size of a line or other underground facility.

Protective System: A method of protecting employees from cave-ins of material that could fall or roll from an excavation face or from the collapse of adjacent structures. Protective systems include support systems, shield systems, and other systems that provide necessary protection.

Risk Assessment: The process of identifying potential hazards and implementing appropriate controls to reduce the risk identified, (JSEA/JHA).

Qualified Equipment Operator: A person who through experience and/or training and with the endorsement of their employer is competent to operate equipment used in ground disturbance and/or excavation activities. The Competent Person shall verify that the Operator is on the OC Qualified Equipment Operator list prior to beginning work activity. The OC shall maintain a list of Qualified Equipment Operators.

Qualified Line Finder: A person who through experience and/or training and with the endorsement of their employer is competent to operate line finding equipment used to locate buried facilities prior to ground disturbance and/or excavation activities. The Competent Person shall verify that the Qualified Line Finder is on the OC Qualified Line Finder List prior to beginning work activity. The OC shall maintain a list of Qualified Line Finders.

Search Zone: An area 25 feet in all directions surrounding the dig zone. This area shall be swept with line finding equipment prior to issuance of a Ground Disturbance Permit.

Trench Excavation: A narrow excavation made below the surface of the ground where the depth is generally greater than the width. However, the width of a trench as measured at the bottom is not greater than 15 feet.

Note: Excavations more than 20 feet in depth must be designed by a registered professional engineer and are not covered in this policy.

Underground Facility: Any manmade structure located below the surface of the ground.

Vacuum Excavator: Equipment that excavates underground facilities by the combination of alternating water/air or air/air pulsations.

3.0 GENERAL REQUIREMENTS

3.1 Permit Applicability

A Ground Disturbance permit shall be completed by the Competent Person for the following activities:

- Any mechanical excavation (e.g., back hoes, augers) that results in penetration of the ground;
- Any manual ground penetration (e.g., digging with shovels, hammering of stakes, use of vacuum type excavator) greater than 12 inches;
- Any mechanical scraping activity (e.g., road grading, bull dozing) that results in penetration of the ground, includes company owned or maintained lease/well sites and roads.

To be consistent in the BU, the Ground Disturbance Permit to be used in the SPU. (see Section 7.0, Associated Documents/Links Table in the master Ground Disturbance document in the Health & Safety Manual on the web)

3.2 Permit Exceptions/Clarifications

Using fill dirt as an alternative to grading low spots or areas where erosion has occurred, or using stockpiled material, does not constitute a Ground Disturbance activity.

A Ground Disturbance Permit is not required for vacuum excavation for the sole purpose of potholing provided the following items are completed prior to potholing:

- A valid one-call;
- A JSEA/JHA;
- Emergency Response Plan, including system isolation procedure; and
- Any other necessary permits when applicable (e.g., hot work).

Reseeding of plugged and abandoned well sites is allowed without a permit and "grid pattern" survey provided a One Call has been made and there are no pressurized lines in the ground disturbance area.

Snow removal does not constitute Ground Disturbance.

For permit requirements associated with Hydrovac excavation, refer to the Ground Disturbance Permits for Hydrovac Flowchart. (see Section 7.0, Associated Documents/Links Table in the master Ground Disturbance document in the Health & Safety Manual on the web).

An MOC, including a risk assessment and action plan, is required to vary from permit or any other requirements of this document. Any variation following completion of the MOC must be approved by the Asset Manager or their designee and the SPU Technical Authority (TA). Variations that are more stringent than those required in this document, do not require the exceptions process.

Federal, State or local regulations, which are more stringent than Business Unit guidance, will be followed.

3.3 General Permit Requirements

A Ground Disturbance Permit, JSEA, and a copy of the One Call shall be located at the dig site while the excavation is in progress.

The permit shall be available at the work site until the activity is completed. A new permit shall be issued, at the start of each new work shift/day, and also if there is a change in conditions or in the job scope, and/or after job stoppages due to emergency situations.

The Competent Person must be thoroughly familiar with all sections of the permit outlining requirements applicable to the job. Expired Ground Disturbance Permits shall be kept on file as per Operating Center recordkeeping requirements.

Contractor procedures shall satisfy all requirements of this practice.

Consideration should be given to isolate and depressurize/de-energize any underground facilities within the dig zone.

The Exceptions Process in Section 5.7.4 of this document is required for any variation from the Ground Disturbance Practice.

3.4 Third Party Crossings

Any 3rd Party activity that encroaches (encroachment is defined as a line crossing or paralleling within 10 feet of a line) on the BP Right of Way or near any BP pipelines or facilities shall require a Competent Person (contractor or BP) to be present for activity in the Right of Way and a formal crossing agreement completed when applicable. De-pressurizing lines must be considered and a risk assessment completed by a Competent Person for the 3rd party crossing. Any damage to BP property resulting from 3rd party activity shall be reported immediately to the BP Competent Person. Mechanical excavation will not be done within the 2 foot minimum clearance limit around underground lines or facilities, unless the requirements in 5.7.2, 5.7.3, or 5.7.4 are met.

4.0 KEY RESPONSIBILITIES

The OC shall ensure that the requirements of this program are implemented and enforced.

All employees involved in or impacted by Ground Disturbance activities shall comply with this process and any site-specific procedures.

5.0 GROUND DISTURBANCE PERMIT PROCESS

5.1 One Call Notification (permit item 1)

A Competent Person must ensure that the appropriate regional One Call Notification Center has been notified of all planned excavation activities and a request for line locates has been registered. The Competent Person will affirm that responses have been received from all facility owners and that all lines have been located and marked prior to any excavation activity. When in doubt, a Competent Person will investigate the possibility of underground lines and contact appropriate parties as needed for verification.

5.2 Line location & Plot Plan (permit item 2)

Available records shall be referenced and contacts made to determine the existence and location of underground facilities/pipelines and utilities in the vicinity of the work area.

It is a Competent Person's responsibility to confirm that all available sources of information have been obtained and cross-referenced to ensure, as far as is reasonable and practical, the existence of all facilities/pipelines and underground utilities is known and understood. Sources of information, including but not limited to, the following must be referenced when applicable to the job:

- One Call - Provides a listing of companies who registered buried facilities in the proposed work area. Some public utilities and private companies are not members of One Call. A 48-hour waiting period is required prior to beginning work. Emergency situations (interruption of essential public service has occurred) may require less waiting time. State and local laws should be researched and incorporated in local procedures.

- Consult Area Operations Personnel - Plot plans, pipeline or facilities maps, or lease drawings (as available) must be obtained and discussed with area operations personnel. Company personnel familiar with area operations may have knowledge of facilities/pipelines and abandoned lines not otherwise documented.
- Visible Company Markers - Check the work area for facilities/pipelines, or utility markers and ensure the company named has been contacted to supply any additional information regarding underground facilities. (Never rely solely on company markers for location purposes. Markers may have been knocked down or removed at some point in the past and may have been repositioned inaccurately.)
- Visible Indicators - Are there any signs of ground disturbance within the proposed work area, including the search zone? This may include facilities/pipelines, power lines, gas co-ops, utility cables, new clearings, spoil piles, road construction, pipeline signs, settlement, vegetation color changes or growth. If there is any visual sign of activity that is not reflected on the plot plan the plan shall be updated.
- Discussion with Landowner - Landowner and/or Tenant may also have additional knowledge of buried utilities not documented elsewhere and should be contacted when reasonable and practical.

A plot plan, pipeline or facilities map or lease drawing indicating the location of all underground facilities and utilities shall be available for reference at the work site.

Ground Disturbance activities shall not proceed without a plot plan, facilities/pipelines map or drawing clearly indicating the number of facilities/pipelines or utilities, line sizes, locations and alignments. Available plot plans or lease drawings must be reviewed and cross-referenced with other sources of information to ensure they are accurate and complete. Plot plan should be retained in appropriate file, normally with the

Ground Disturbance Permit. Plot plans shall be updated to reflect "as built" underground facilities and maintained for future reference.

If a plot plan, facilities/pipelines map or lease drawing is not available, but it has been determined from referencing other sources of information that buried lines do indeed pass within 25 feet of the dig zone, a drawing must be prepared before digging can begin. This drawing may be hand drawn but must reflect all available information accurately.

5.3 Approvals & Agreements (permit item 3)

- Approvals and agreements (as applicable) either verbal or written have been obtained.
- Pipeline Permits and Licenses (new installation, additions to existing lines, abandonment's).
- Notification to underground facility owner(s) regarding intent to cause ground disturbance within the search zone, (25 feet on both sides of dig zone).
- Notifications of landowners and or tenant, where deemed reasonable and practical.
- Facility crossing agreements.
- Proximity and Common Right of Way Agreements will be checked, if available.

5.4 Pre-Job Safety Meeting (permit item 4)

A pre-job safety meeting including a Job Safety Environmental Analysis, Ground Disturbance Permit, and Emergency Response Plan review, will be held. Appropriate documentation of such meeting will be kept with the permit.

The following topics (as a minimum) have been discussed and the meeting minutes (with signed attendance list) have been recorded and retained on file per local policy.

- Review of potential hazards, safe work procedure, permitting requirements, etc.

Agreement that mechanical ground disturbance does not occur unless a Competent Person is present at the job site. A Competent Person will determine if there is a need to be present during ground disturbance activities if there are no underground facilities/pipelines in the search or dig zones, or when manual potholing is being done (shovels, or vacuum excavator).

- Mechanical excavation equipment must not be used to dig within 2' (or greater if specified in the crossing agreement) of an underground facility. An equipment spotter must be in place for all excavation within proximity of any underground utility and the 2' no dig zone must be adequately marked. If the attention of the spotter is diverted elsewhere or they leave the site, the excavation operation SHALL STOP until his/her return. The spotter shall remain out of the swing radius of the excavation equipment. The spotter shall be in direct vision of the equipment operator at all times during excavation.
- When excavating, proper cutback and shoring must be done in accordance with local, state and federal regulations and BP Onshore US Safety Practice requirements.
- Pick axes can only be used following evaluation and approval by a Competent Person.
- Agree that all workers have the right and responsibility to "Stop the Job" when they suspect work procedures or conditions might be unsafe.
- Personal protective equipment requirements, including need for use of fire retardant clothing, will be discussed.

All accidents, injuries, first aids and near miss incidents must be reported immediately.

5.5 Emergency Response Plan (permit item 5)

A site-specific Emergency Response Plan must be in place and reviewed at the pre-job meeting. This Emergency Response Plan information must be available at the work site at all times when work is being performed. At a minimum, the Emergency Response Plan must include: facility contact names and phone numbers, system isolation procedure and isolation valve locations, muster area, phone numbers for emergency services, directions to the work site.

5.6 Facility Marking (permit item 6)

All known pipelines and utilities, as noted on the plot plan, pipeline map, or drawing, that pass within the search zone of an underground facility (25 ft of outside of the dig zone in all directions) have been located, identified and marked to indicate location and alignment.

A Qualified Line Finder, shall conduct line-locating procedures utilizing available pipeline maps, or plot plan. Additionally, the search zone shall be swept by a Qualified Line Finder.

The Search Area will be electronically swept (blind sweep) using four separate "grid patterns" (e.g., North - South, East - West, NW - SE, and NE - SW) using blind sweep search techniques to ensure maximum detection capabilities. If the blind sweep shows no indications of underground utilities, the work may proceed after completion of all permit requirements. If the blind sweep detects an unknown underground utility, the work may continue only after ensuring that the utility is not within the dig zone, this may require safe exposure methods and using other information sources.

The lines must be clearly identified and marked within the search zone (25 ft beyond the dig zone in all directions). All lines should be marked at 15' intervals (or less as required for clarity of locate).

While the use of "Witching Rods" is allowed lines located using "Witching Rods" cannot be considered accurate and will be identified on the plot plan as possible locations of lines.

The following color code, is to be used:

Search Zone Perimeter - **White**

Temporary Survey Markings - **Pink**

Electrical - **Red**

Nonpotable Water - **Purple**

Potable Water - **Blue**

Gas & Oil - **Yellow**

Drainage/Sewers - **Green**

Communication - **Orange**

Plot plans; facilities/pipeline map, and drawing must be cross-referenced with the placement of markers prior to mechanical excavation to ensure there are no apparent inconsistencies. If there are inconsistencies between the plot plan, facilities/pipeline maps, or drawing and placement of stakes, another line locate must be done to verify correct line location and alignment.

5.7 Verifying & Exposing Underground Facilities (permit item 7)

All underground facilities within 2 ft of the new facility being installed (or within 10' if paralleling the facility) have been hand exposed or vacuum excavated to verify location, line size, and alignment. All underground facilities and utilities, identified at facility crossing shall be exposed.

An MOC, including a risk assessment and action plan, is required to vary from the Ground Disturbance Permit requirements, or any other requirements of this Practice. Any variation following completion of the MOC must be approved by the Asset Manager or their designee and the SPU Technical Authority (TA). Variations that are more stringent than those required in this Practice do not require the TA approval, but local MOC use and approval will normally still be required.

When constructing a new pipeline that runs parallel to an existing underground facility, a minimum separation distance of 5 ft between the lines should be maintained. In circumstances where a 5 ft. distance cannot be maintained (i.e. possibly due to ROW agreements or landowner restrictions)

additional precautions must be implemented. (i.e. exposing the original line at shortened intervals to confirm its orientation, depth, and location is one option that might be considered).

Note: when digging in proximity to energized underground facilities every effort should be made to limit people in the immediate dig vicinity to essential personnel only. This serves to minimize the number of people that could be in the line-of-fire, were an incident to occur.

5.7.1 Exposing Flagged or suspected Underground Facilities:

- Use vacuum excavation or hand dig to expose (pothole). The pothole(s) must be made large enough and suitably spaced to accurately determine location, depth, orientation and line size.
- If exposing for the purpose of crossing or repair, the pothole(s) must extend a minimum of 2' from the line in all directions.
- When constructing a new pipeline that runs parallel to an existing line (within 10'), the existing line must be initially potholed to confirm size, depth and location, and then at appropriate intervals, to confirm alignment. Intervals will be determined by the Competent Person and be indicated on the Ground Disturbance Permit.

Note: You must always maintain 2 feet of clearance around underground facilities when using mechanical equipment unless conditions exist as described below in sections 5.7.2, 5.7.3, or 5.7.4.

5.7.2 Underground Facilities that cannot be exposed by hand digging or vacuum excavation: or lines that cannot be located by line locating equipment.

- Competent Person shall be on site during line exposure.
- Pipeline must be properly isolated (locked and tagged out).

Preparation for mechanical excavation within the 2 foot clearance limit: Facilities containing fluids or gas (flammable or non-flammable) will be properly de-pressured. If venting to the atmosphere is necessary, impact to the environment and to the public will be considered and venting procedures modified as required. Depressurization shall mean reducing the pressure on a line or piping system to 0 psig or as close to that as is reasonable and practical. When determining the maximum acceptable pressure, Operating Center personnel must at a minimum take into account factors such as line size, total stored energy, the total potential release volume, and potential spill volume (i.e. 5 psig may be an acceptable risk for a short small diameter line, but could be considered a more significant and unacceptable potential hazard for a longer, or larger diameter line). The Operating Center Manager or their designee will decide on a case-by-case basis when lines are acceptably depressurized. It is the expectation within this Practice that all lines be depressurized when Mechanical excavation is done within the 2 foot clearance limit.

There will be some very limited cases (e.g. water irrigation systems) where an exception to the depressuring and 2 foot clearance limit is made, but it would require adherence to the exception process covered in Section 5.7.4 of this document. If a line in question is 3rd party owned, a request shall be made to them to properly depressurize their line.

Note: It is understood that leaving some minimum positive pressure on the facility may eliminate the need for, and risk associated with, purging when the facility is ready to be reenergized. This is acceptable and will often be the preferred approach.

- Mechanical equipment will be allowed to remove soil from around the underground facility closer than 2 feet following proper depressurization. Caution should always be taken to not damage the facility's coating.

- If during this process there is damage to pipe or coating, report immediately to BP personnel. Competent Person will supervise repairs and document damage.
- **All other Ground Disturbance permit requirements shall apply.**

5.7.3 Underground Facilities that will not be exposed by hand digging or vacuum excavation.

- All of the bullets listed under 5.7.2 shall apply.
- Determination to not expose pipeline shall require OCM or their designee, approvals to proceed with ground disturbance. Approval shall be case specific based on an acceptable business case with consideration for risk and cost.
- The decision to not expose will often apply to situations involving a nonmetallic pipeline or an automation cable, but can be equally valid for metallic pipelines and other non-energized facilities.

5.7.4 Exceptions Process

- A Management of Change (MOC), including a risk assessment and action plan, is required to vary from any requirement noted in this Practice, or listed on the Ground Disturbance Permit. The MOC must be approved by the Asset Manager or their designee **and** the Business Unit Technical Authority (TA). Variations that are more stringent than those required in this Practice do not require following this exceptions process, but **will** normally require a locally approved MOC.

- A proposal to reduce a requirement of this Practice must be given careful consideration and follow the process outlined above. The following items at a minimum must be considered as part of the associated MOC risk assessment: any regulatory or legal requirements; potential for spills and proximity to waterways or other environmentally sensitive areas; the amount of stored energy within the system; potential for gas leakage and migration; and the proximity of the operation to personnel, public dwellings and other developed areas such as buildings, roadways, or parks.
- Unless explicitly addressed in the MOC, all other provisions and requirements in the Ground Disturbance Practice and Ground Disturbance Permit shall apply (including requirements for the Competent Person to be on site).

5.8 Additional Permits (permit item 8)

Additional Safe Work Permits (e.g., Hot Work, Confined Space Entry, etc.) as per the BP Onshore US Safety Practices may be required. If the excavation is complex or involves multiple underground facilities, job specific procedures must be developed.

5.9 Overhead Lines (permit item 9)

Overhead power lines that may pose a hazard during movement of equipment must also be clearly indicated and clearances must be maintained. Barricades shall be placed to prevent equipment from inadvertently crossing under a line. A spotter is required to assist equipment operators in maintaining required safe distances while equipment is in operation.

5.10 Environmental Evaluation (permit item 10)

Ground Disturbance activities in certain areas may require specific environmental permits or plans. Ground Disturbance activity projects such as remediation, location restoration and site development will normally need Ground

Disturbance Permits. Items such as wetland disturbance permits, dredging or filling permits, storm water discharge permits, and critical or sensitive habitat determination and pollution prevention plans may be required.

Archaeological sites may also be present and each location should be evaluated and permits obtained as applicable.

Consult your Environmental Coordinator or Specialist prior to any ground disturbance activities in environmentally sensitive or culturally rich areas.

5.11 Operating Center Communication (permit item 11)

Notifications to appropriate involved and/or responsible internal personnel (e.g., Land Department, OC Managers, Supervisors, Team Leaders, Field Technicians, Mechanics, Drilling/Completion/Workover personnel etc.) must be made prior to issuance of a permit per individual OC requirements.

5.12. Non-Traceable Lines (permit Item 12)

New non-traceable (nonmetallic) underground installations shall always be installed with permanent line locating capabilities.

5.13 Review of BP Ground Disturbance Practice (permit item 13)

All personnel involved with the excavation have received the appropriate training per the Ground Disturbance Practice.

5.14 Excavation Design (permit item 14)

All excavations shall be made in accordance with the rules, regulations, requirements, and guidelines set forth in 29 CFR 1926.650, .651, and .652, the Occupational Safety and Health Administration's standard on Excavations. Maximum Allowable Slopes, OSHA Soil Classification, Soil Analysis

Excavations greater than 4 feet in depth in which oxygen deficient or hazardous atmospheres could reasonably be expected to exist shall be treated as confined spaces. Atmospheric testing and a confined space permit will be completed before employees enter such excavations.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth. A safe means of egress must be within 25 feet of each employee in the excavation.

Ladders shall be secured in a manner to prevent movement while in use and shall extend 3 feet over the trench top.

An earth ramp may be considered a safe means of egress only if employees are able to walk the ramp in an upright manner when entering or exiting the trench.

The edges of all open trenches must be protected from falling items. Excavated soil and equipment (such as tubulars) must be kept at least 2 feet from the edge of the trench (or have retaining devices to prevent their falling into the trench).

All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

No employees or contractors shall be permitted underneath loads handled by lifting or digging equipment.

Employees and/or contractors shall not work in excavations in which there is accumulated water or in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. Construction Checklist for Trenching

Additional requirements related to protective system, i.e. sloping & shoring, are contained in Excavation Protective Systems.

5.15 Daily Inspections (permit item 15)

Daily inspections of excavations, adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that will result in possible cave-ins or other hazardous conditions. Inspections shall be documented and be required when personnel are entering trenches. Checklist example: Trench Safety Daily Field Report

A documented inspection shall be conducted by a Competent Person (BP or contractor) prior to the start of work and as needed throughout the shift (e.g. when additional hazards may be created due to weather.)

Where a Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure or protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary corrective actions have been taken to ensure their safety.

Where the stability of adjoining buildings, walls, foundations, or other structures is endangered by excavation operations, support systems such as shoring, bracing or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Where employees, contractors or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.

5.16 Unattended, Open Excavations (permit Item 16)

Adequate physical barrier protection shall be provided at all excavations to protect workers, the public, livestock and wildlife. All wells, pits, shafts, etc. shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc. shall be backfilled.

5.17 The Competent Person shall confirm that the Qualified Equipment Operator and spotter involved with a Ground Disturbance review and sign the Ground Disturbance Permit. Additionally, all involved personnel on-site should review/sign the JSEA/JHA.

6.0 TRAINING

For additional training information, refer to NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

Training requirements are listed in Table 1 below:

	Full BP 8 Hr. Ground Dist.	Ground Disturbance General Awareness	Excavation Equip. Operator Awareness	OSHA(1) Training
Competent Person	X			X(2)
Equip. Operators		X	X	X(3)
Anchoring Personnel		X	X	
All others involved in G.D. Activities		X		

- (1) OSHA soil classification and trench safety training.
- (2) All Competent Personnel should have the OSHA excavation training; this encompasses not only soil classification, but excavation safety and rules to follow.
- (3) If the Excavation Equipment Operator will only be Auguring or Drilling, they do not have to take the OSHA soil classification and trench safety training.

The OC shall insure that all employees and/or contractors who participate in Ground Disturbance activity receive BP Ground Disturbance Training prior to their involvement in the activity and a minimum of every three years thereafter.

- Each Competent Person shall receive training in the recognition of applicable hazards associated with Ground Disturbance activities and corrective measures required to eliminate such hazards.

- Each Qualified Equipment Operator shall be instructed in the safe competent operation of equipment used in Ground Disturbance activities. Competency training shall also include BP Ground Disturbance awareness requirements for equipment operators.
- Each Competent Person who will be signing the Trench Safety Daily Field Report and authorizing personnel to enter an excavation shall attend and successfully complete the OSHA Excavation and Trenching course.
- Each Qualified Line Finder shall be instructed in the safe and competent operation of equipment used to locate buried facilities as well as locating techniques prior to Ground Disturbance activities. Training from an equivalent external source is acceptable, but must be approved by the Business Unit Technical Authority (TA). NOTE: Vendor training alone will NOT be acceptable for qualification of Line Locators. Refer to Table in the minimum Training and Curriculum for Line Locator.
- Awareness training shall be available for individuals that are impacted and/or involved in ground disturbance activity.

The training shall include a mechanism of ensuring employee and/or contractor's comprehension of the Ground Disturbance process and/or associated equipment.

Retraining shall be provided whenever there is a change in the Ground Disturbance process, whenever job changes or changes in equipment or processes present a new hazard, in response to a local OC incident, or when there is reason to believe that there are inadequacies in the employee and/or contractor's knowledge.

All training must be documented, including knowledge verification by means of examination with the date and names of employees and/or contractors attending the training.

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Ground Disturbance document in the Health & Safety Manual on the web.

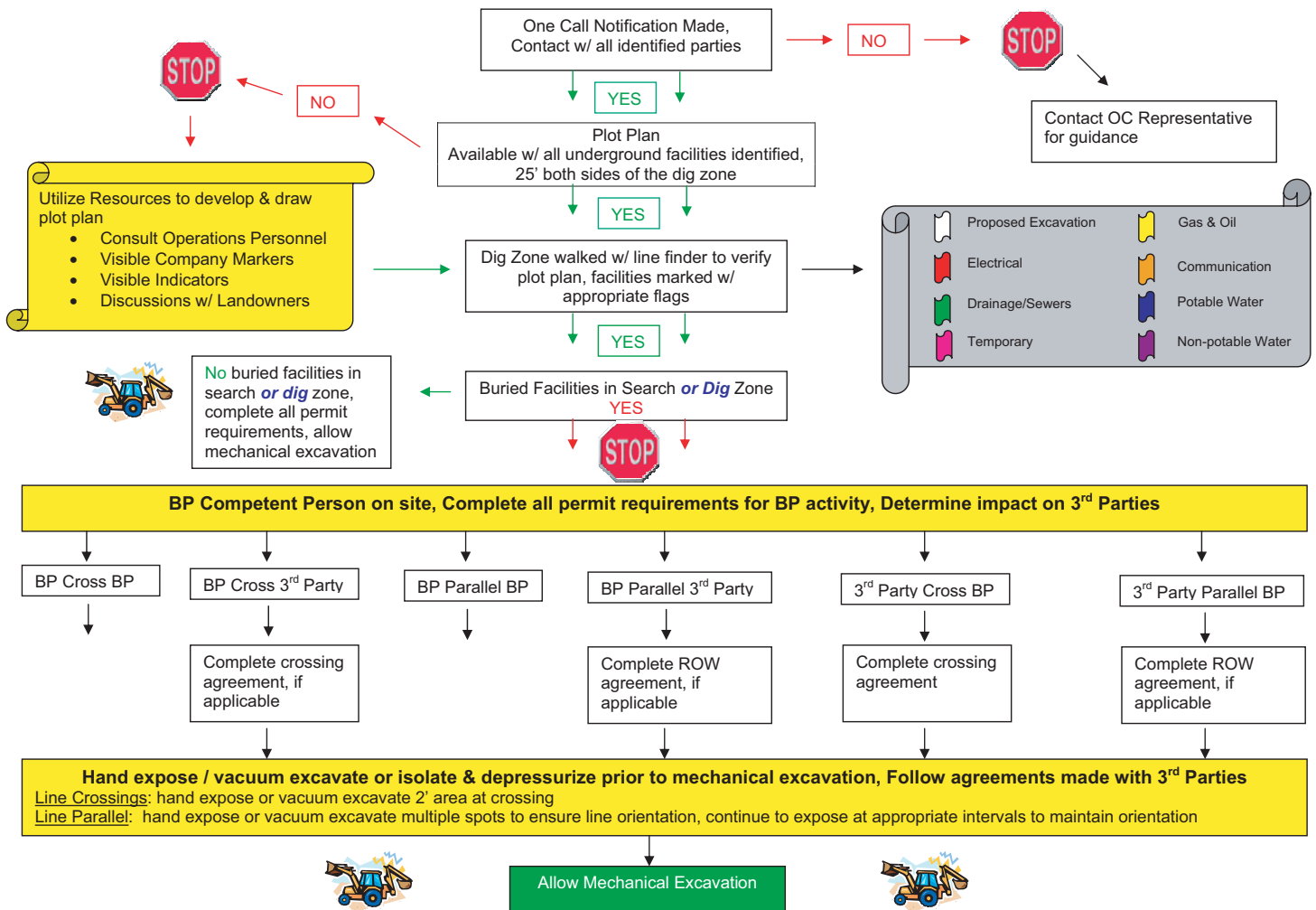
7.1 Required Minimum Best Practices Incorporated by Reference

The following best practices are required and incorporated by reference into the Onshore BU ground disturbance practice. Each Operating Center shall comply with the minimum requirements set forth in each of these practices. An Operating Center may develop specific local practices that meet or exceed the requirements of these best practices at any time. However, any specific local practices that relax the requirements in the Ground Disturbance Practice must be developed in accordance with the Management of Change process. A Ground Disturbance related MOC must be approved by the Asset Manager or his designee, and the Onshore Business Unit Ground Disturbance Technical Authority (TA).

BEST PRACTICES:

- BP Crossing/Encroachment Information & Guidelines
- Pipeline Repair and Modification
- Backfilling
- Probing
- Driving T-Posts
- Gas Pipeline Deactivation & Abandonment Procedures - Onshore
- Maintenance & Installation of Pipeline Warning Markers
- Installation of Non-Metallic Pipelines
- Application of Protective Coating
- Damage Prevention; One-Call; Pipeline Patrolling/Surveillance and Response to Unauthorized Activity and Reported Damage
- Pipeline Mapping Systems

NAG SPU Ground Disturbance Flowchart



bp



HAZCOM

HAZCOM

HAZARD COMMUNICATION PROGRAM

The Hazard Communication Program provides personnel with information to enable them to protect themselves from hazardous chemicals presenting physical and/or health hazards under normal conditions of use or in emergency situations. NAG and site-specific hazard communication written programs are accessible to personnel and components include: chemical inventory lists, material safety data sheets (MSDSs), container labeling and other forms of warning, and employee training programs.

GENERAL REQUIREMENTS

Personnel should:

- Be aware and know that hazardous chemicals are in use at the worksite.
- Identify hazards associated with both routine and special tasks and projects to confirm that hazards and required controls are communicated to work crews as part of the JSEA process, seek chemical hazard recognition assistance as necessary.
- Participate in annual hazard communication training.
- Read and understand MSDSs and chemical labels.
- Report hazard communication compliance issues to their supervisor or Health, Safety and Environment (HSE) staff.

NEW CHEMICALS

Prior to obtaining, purchasing, and/or using a chemical, a current MSDS (hardcopy or electronic format) and new chemical evaluation request must be submitted to HSE staff. A technical MoC shall be completed by HSE staff as part of the new chemical evaluation process as needed.

CHEMICAL INVENTORY

The site chemical inventory contains MSDSs for all products in stock or use and shall be updated as new chemicals are introduced or removed at a worksite. The product name and manufacturer on the inventory should be identical to the MSDS and container label. MSDSs must be obtained for those products without an MSDS in the system.

MSDSs

MSDSs are maintained in binders in hardcopy form at the operating center. For those sites using electronic MSDS systems, MSDSs may also be accessed on any computer with access to the BP intranet or internet at MSDS Solutions at <http://eservice.msdsolutions.com> (username: bphouston and password: houston1). MSDSs received by personnel must be forwarded to HSE staff or the designated individual at the local operation who is responsible for maintaining current MSDSs and chemical inventory files. MSDSs are considered employee exposure records and should be retained for 30 years from the date of the last known exposure of the chemical.

LABELS

Labels for hazardous chemical containers (e.g., vessels, tanks, drums) are an immediate warning of hazards and must include: (1) the identity of the hazardous chemical and (2) appropriate hazard warnings (including target organ health effects) resulting from exposure under normal conditions and in emergencies. Purchased and shipped chemical containers must also include the name and address of the manufacturer. Labels are readily available in the work area throughout the workshift (contact HSE staff) or may be printed from MSDS Solutions for any product with an MSDS in the system.

Numeric and alphabetic codes, including HMIS (Hazardous Material Information System) and NFPA (National Fire Protection Association), and process sheets are acceptable alternative in-plant labeling systems, despite the absence of target organs. But, personnel should know how to use/understand the alternative system and be aware of chemical hazards and target organs.

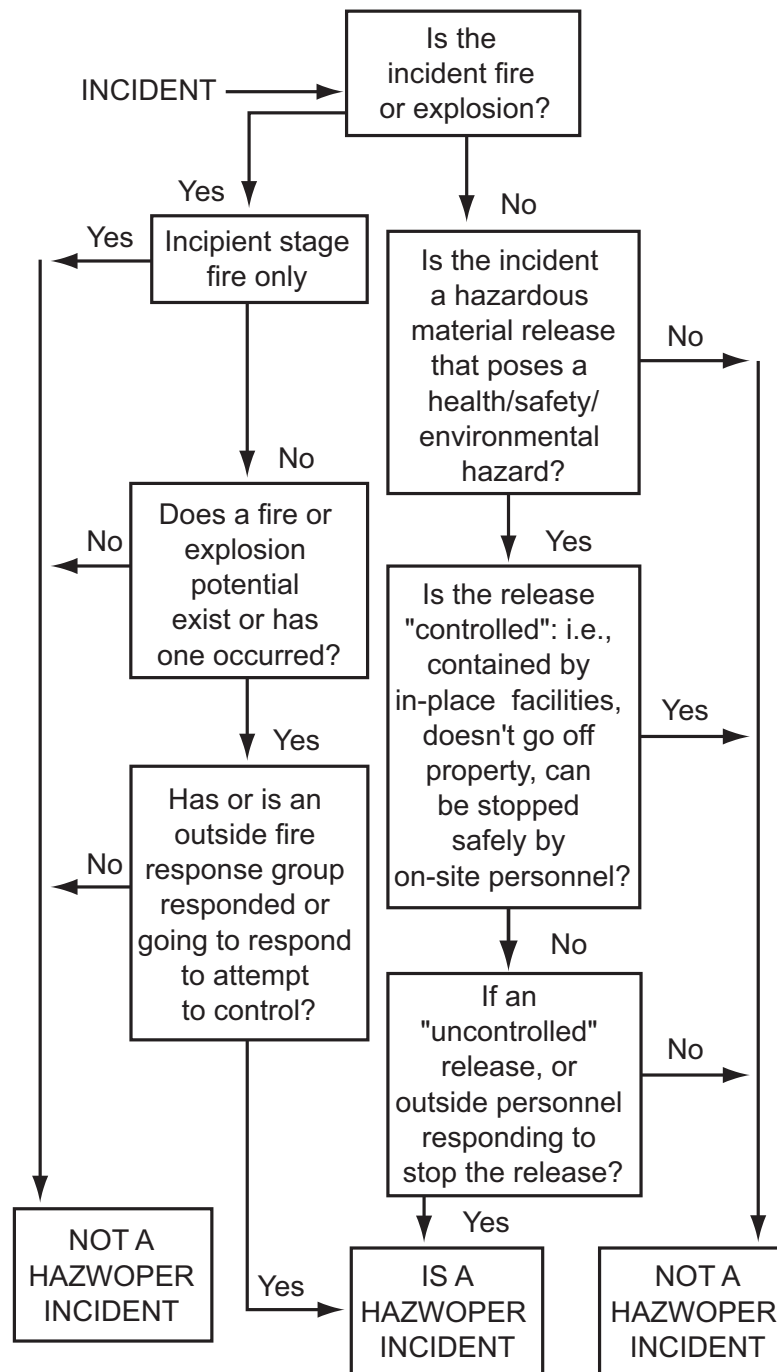
Contract employers are responsible for providing hazard communication training to their employees prior to arrival on a BP NAG worksite, managing their chemical inventories and retaining/archiving MSDSs. Additionally, contract employers must provide MSDSs to BP NAG for all hazardous chemicals brought onto a BP NAG worksite.



HAZWOPER

HAZWOPER

DECISION TREE- INCIDENT CLASSIFICATION





HEARING CONSERVATION

HEARING CONSERVATION PROGRAM

GENERAL REQUIREMENTS

All Operating Centers shall comply with the NAG Hearing Conservation Program (HCP) regarding the protection of employees from occupational noise exposure. All personnel whose noise exposures equal or exceed 85-dBA time weighted-average (TWA) for an 8-hour shift or 82 dBA TWA for a 12-hour shift are included in the hearing conservation program.

The NAG HCP includes the following key elements:

- Initial workplace sound level surveys shall be conducted. Areas will be resurveyed when process or equipment changes occur that may significantly increase the noise level or the number of persons exposed. Equipment or process changes must be identified in the Management of Change (MoC) process.
- Signs shall be posted at or before the entrance to each location or on equipment where continuous noise levels are 85 dBA for an 8-hour TWA or 82 dBA for a 12-hour TWA.
- Various forms of hearing protection are to be made available and must be worn in posted areas. Areas identified as double hearing protection require both muffs and plugs.
- Representative personal noise monitoring and sampling strategies shall be designed and conducted to identify personnel for inclusion in the HCP and to enable the proper selection of hearing protectors.
- Those enrolled in the HCP program must have an annual audiogram and receive training on the program and proper hearing protection.
- Assessment and implementation of feasible engineering and/or administrative controls shall be conducted to reduce noise exposure. Assessments shall be documented in the Operating Center's HSSE files.



HOT WORK

Hot Work

HOT WORK (K0000000460)

1.0 PURPOSE / SCOPE

The purpose of this document is to establish the minimum requirements associated with work activity that has a potential for introducing ignition sources into a hydrocarbon-containing, or otherwise designated work area. The scope is intended to include Hot Work activity (as defined) and applies to activities associated within North America Gas (NAG) Onshore US Operations.

2.0 DEFINITIONS

Combustible Liquid: A liquid having a flash point at or above 100° F (37.8° C). Examples include lubricating oils, many paints and glycols.

Combustible Solids: Substances that are capable of igniting and burning and will freely support combustion once ignited. Examples include wood, paper, oily rags and used filters.

Continuous Gas Monitoring: Continuous gas monitoring is used to provide early warning of the presence of flammable vapors and gases. Continuous monitoring requires the use of direct reading gas testing equipment that has the ability to perform uninterrupted sampling. Continuous gas monitoring should include consideration of wind conditions, potential hazards and job site location. Additional sampling equipment (e.g., sample probes, sample tubes or sampling pumps), may be needed in order to access areas without physically entering them.

Control of Work (CoW): Roles and Responsibilities as defined in the NAG SPU Control of Work Policy.

Designated Areas: Hot Work Permits are required when performing Hot Work on all BP hydrocarbon production sites including well pads, within the defined perimeter of production facilities and around exposed pipelines. Due to the amount of entrained gas in produced water, there is no distinction made between hydrocarbon and produced water facilities for designation as a Hot Work area.

Fire Watch: A designated person who observes Hot Work, is capable of identifying existing and predictable fire or explosion hazards in the working conditions or surroundings and who has authorization to take prompt corrective measures to eliminate them. Refer to Section 5.2 of this document for additional information.

Flammable Liquid: A liquid having a flash point below 100° F (37.8° C). Examples include gasoline, methanol, condensate and toluene.

Hot Work: Any work that generates sufficient heat to ignite combustible or flammable materials. Local operating procedures may exempt lighting gas fired vessels from the requirements of this practice provided that a documented risk assessment is conducted and measures are in place to confirm compliance with the NAG Lighting Gas Fired Vessels Procedures. Facilities regulated by OSHA CFR 1910.119 shall not make any exceptions to this practice.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s) identified. The JSEA shall be discussed with all personnel involved before Hot Work begins.

Lower Explosive Limit (LEL): The lowest concentration of an explosive gas in air that will support combustion. Methane has a LEL of 5% at atmospheric pressure and 60° F. As pressure or temperature increases, the LEL will decrease.

Open Flame Hot Work: Hot Work that is a high energy / high temperature processes and / or equipment that has the likelihood of igniting flammable or combustible materials. Examples include activities such as welding, flame cutting and grinding, which can be difficult to confine within a controlled area and have the potential to shower sparks and hot molten slag outside of a controlled work area.

Process Equipment and Piping: Includes well heads, vessels (e.g. separators, treaters, dehydration units, and etc.), and production tanks that contain flammable liquids and gas and in-plant/facility piping systems.

3.0 GENERAL REQUIREMENTS

3.1 The following activities or the use of certain tools, equipment or vehicles that shall require a Hot Work Permit include, but are not limited to:

- Welding
- Flame cutting
- Chipping
- Grinding
- Portable heaters or steamers
- Portable air movers
- Hot oiling or other trucking operations involving an open flame (e.g. Nitrogen Operations or heating frac water) within 150 feet of hydrocarbon containing equipment
- Sandblasting operations (static charges)
- Some air equipment such as jackhammers, chippers or grinders
- Motor vehicles operated within ten (10) feet of hydrocarbon containing process equipment and piping

3.2 The use of non-intrinsically safe equipment, such as vehicles, flashlights, cell phones, personal digital assistants, computers, pagers, and cameras, or other spark producing activities that may create an ignition source shall be governed by API Recommended Practice 500 and the latest National Electric Code.

3.3 No Hot Work shall be conducted where the gas concentration exceeds 10% of the Lower Explosive Limit (LEL). Pipeline repairs require special consideration when performing Hot Work and the Onshore US Pipeline Repair Procedure shall be followed.

3.4 Within designated areas, the Issuing Authority may define an area where Hot Work may be performed without a Hot Work Permit, but in no case shall Hot Work be conducted closer than 35' to any hydrocarbon-containing line or vessel / tank containing a flammable or combustible substance without a Hot Work Permit.

3.5 Hot work permits are also required for BP facilities where hydrocarbons are not produced, such as offices and warehouses, to the extent that open flame Hot Work Activities are being performed. In these types of non-hydrocarbon producing areas, a Hot Work Permit is required when open flame Hot Work is performed closer than 35' to any flammable or combustible material.

3.6 If new hazards are identified or controls of existing hazards are compromised, Hot Work Operations shall be suspended. Work shall not resume until the hazardous condition(s) are eliminated and the area is resurveyed and determined to be safe. The Issuing Authority (IA) shall determine if a new permit is required.

3.7 Calibration and function testing of flammable gas monitors/meters shall be performed prior to their use in accordance with the manufacturer's recommendations. Calibration records shall be documented in a log, electronic file or database and must be readily accessible (Refer to the Flammable and Combustible Gas Monitors, Use and Calibration Procedure).

3.8 Special consideration shall be given to tanks that are being purged with an inert gas. Combustible gas indicators and meters may not accurately measure the combustible gas in a tank being purged with an inert gas, such as nitrogen. Consult your HSE representative to determine if specialized monitoring equipment may be needed. Any Hot Work in a tank or other confined space shall also conform to the permit and work requirements of the Onshore US Confined Space Entry Practice.

3.9 Operations shall be conducted in accordance with the Hot Oiling and Similar Open Flame Equipment Requirements. A Hot Work Permit is required if a hot oil unit or other trucking operations involving an open flame (e.g. Nitrogen equipment or heating frac water) is located closer than 150 feet from any combustible liquid or flammable vapor/gas source.

3.10 Electrical installations in designated areas shall be installed in accordance with API Recommended Practice 500 and the latest National Electric Code (see Non-mandatory 'SAMPLE' Hot Work Permit Flowchart).

4.0 KEY RESPONSIBILITIES

Key responsibilities for the positions identified below are defined in **Section 3.2 of the NAG SPU Control of Work Policy**:

- Area Authority (AA)
- Issuing Authority (IA)
- Performing Authority (PA)
- Person in Charge (PIC)

5.0 PROCESS

5.1 Hot Work Permit

5.1.1 The Process for obtaining a Hot Work Permit is as follows:

1. Request Permit - Performing Authority (PA) and/or Issuing Authority (IA)
2. Initial Permit - Area Authority (AA)
3. Authorize - Area Authority (AA)
4. Permit Issue - Issuing Authority (IA)
5. Permit goes live (Work Execution) Performing Authority (PA)
6. Job Complete - Performing Authority (PA)
7. Permit to Work Complete - Issuing Authority (IA)
8. Work Complete and Permit Closed - Authority (AA)

5.1.2 The following information on the Hot Work Permit shall be completed: (see Non-mandatory 'SAMPLE' Hot Work Permit Form)

- Date
- Person in Charge (PIC)
- Issued to (company)
- Operating Center (OC)
- Location
- Multiple Location Permit (Yes - No)
- Description of work to be done
- Emergency Numbers
- Start Time
- Permit Expires
- Complete Items (A) through (P)
- Gas Test Results
- Pipeline repair (Yes - No)
- Fire Watch Name (Print)
- Fire Watch Name (Signature)
- Special Precautions
- Area Authority Notification and Contact Numbers, Date and Time
- Issuing Authority Signature and Contact Numbers, Date and Time
- Performing Authority (PA) Signature and Contact Numbers, Date and Time
- Person in Charge (PIC) Signature and Contact Numbers, Date and Time
- Post Work Survey and Close-Out signed off by Issuing Authority (IA) and Contact Numbers, Date and Time
- Employee verification and acknowledgment section
- Debriefing and Associated issues encountered section

5.1.3 Appropriate controls shall be in place to prevent sparks and welding slag from migrating outside the immediate work area by positioning of the work or the use of flooring and/or fire retardant welding curtain/tarps/blankets.

5.1.4 All ducts and/or conveyor systems that could carry sparks outside the immediate work area shall be shut down, sealed, or protected with fire retardant material.

5.1.5 All combustible materials on the floors, walls, or partition ceilings, or roofs that can be easily moved shall be moved at least 35 feet away. When the combustible material cannot be moved, all necessary precautions to protect against exposure shall be taken before a Hot Work Permit is issued.

5.1.6 Atmospheric testing that precedes issuance of a permit shall be as close as practical to the time the work is to begin. The measured percent of the LEL shall be recorded on the permit. Periodic monitoring may be required as determined by the IA. Continuous monitoring is required when a Fire Watch is assigned to a job/task at the discretion of the IA.

5.1.7 Initial testing for flammable gases shall be conducted under the supervision of the IA.

5.1.8 If work is not started within one hour of when the permit was issued or work has been interrupted for one hour or more, the atmosphere shall be checked again for oxygen percent and percent LEL and the permit updated.

5.1.9 It is the responsibility of the AA to confirm with the IA that all control measures have been, or will be, put in place prior to commencement of work activity.

5.1.10 It is the responsibility of the IA to communicate with the AA for the issuance and closure of a permit(s) following work activity.

5.1.11 Opening electrical installations within 35 feet of hydrocarbon sources but outside of Class I, Division 1 or 2 electrically classified areas (see Non-mandatory 'SAMPLE' Hot Work Permit Flowchart) shall require the use of a calibrated meter prior to opening the device. If zero LEL is detected, the electrical installation may be accessed without the need for a Hot Work Permit. Continuous monitoring is required when working on electrical installations without a permit.

5.1.12 The use of non-intrinsically safe equipment such as flashlights, cell phones, personal digital assistants, computers, pagers, and cameras, or other spark producing activities that may create an ignition source shall be governed by API Recommended Practice 500 and the latest National Electric Code. Use of this equipment within Class I, Division 1 or 2 classified areas shall require a Hot Work Permit.

5.1.13 Motor vehicles may not be operated within ten (10) feet of hydrocarbon-containing process equipment and piping unless a Hot Work Permit has been issued. Operating Centers shall develop specific local procedures for vehicle entry into plants and field facilities.

The above requirement does not include:

- Refueling operations
- Buried equipment

Additional site-specific exceptions may only be allowed by utilizing the MOC process.

5.1.14 A copy of the signed permit(s) shall be retained at the job site for the duration of the Hot Work.

5.1.15 Permits shall only be valid for the shift in which the work is started.

5.1.16 A single Hot Work Permit may be used for multiple sites for the following activities only: using a digital camera, non-intrinsically safe line finding equipment or automation/measuring equipment. **The permit shall be reviewed upon entry of each site and the reverse side of the permit shall be completed.**

5.1.17 When any other activity requiring a Hot Work Permit is being performed simultaneously on the same location, a separate permit shall be issued for each activity. The IA shall communicate with personnel working within the area who may be affected by the adjacent activities to confirm that they understand the potential impact on their activity.

5.1.18 At a minimum, closed Hot Work Permits shall be retained for 30 days from closure date.

5.1.19 In the event that Hot Work Operations extend past the permit's expiration time, a new permit shall be obtained.

5.2 Fire Watch

5.2.1 Whenever Hot Work is performed, the IA shall determine the need for a Fire Watch.

According to OSHA 1910.252 (a) (2) (iii), a Fire Watch shall be required whenever welding or cutting is performed in locations where fire, other than a minor fire might develop, or where any of the following conditions exist:

- Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operations.
- Appreciable combustibles are more than 35 feet away but are easily ignited by sparks.
- Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
- Combustible materials adjacent to the opposite side of metal partitions, walls, ceilings, or roofs which are likely to be ignited by conduction or radiation.

The following are examples of activities being conducted in a designated area when a Fire Watch may be required, but are not all inclusive:

- Welding,
- Cutting (with oxy-acetylene or abrasive cut off wheel),
- Grinding, or
- Any activity that, in the opinion of the IA, could create a fire hazard due to the production of sparks or open flame.

5.2.2 The Fire Watch shall:

- Be familiar with the method for alerting personnel in the event of a fire (e.g. fire alarm),
- Watch for fires in all exposed areas, alert personnel if a fire is encountered, and attempt to extinguish incipient fire(s) only when obviously within the capacity of the equipment available,
- Be trained in the proper use of a fire extinguisher,
- Understand the location and nature of the Hot Work,
- Observe the area to be sure the necessary fire protection equipment remains in place and is ready for use,
- Observe the area for combustible and flammable materials, including vapors and liquids,
- Remain in the area while the work is being performed, keeping the Hot Work in his/her line of sight at all times,
- Remain in constant communication range with person(s) doing the Hot Work,
- Stop the work whenever he/she feels the conditions are unsafe, and
- Have no duties other than Fire Watch.

5.2.3 When bulkheads or walls are involved in Hot Work, both sides require a Fire Watch. Caution must be used so that heat transmission through the steel members or pipe does not cause a hazard.

5.2.4 A Fire Watch will remain at the worksite for at least 30 minutes after completion of Hot Work Operations to detect and extinguish possible smoldering fires.

5.3 Risk Management

Risk Management is defined in the NA Gas SPU Control of Work Policy for Type 1 and type 2 Risk Assessments.

6.0 TRAINING

Refer to NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Hot Work document in the Health & Safety Manual on the web.



HYDROGEN SULFIDE (H₂S)

H₂S

HYDROGEN SULFIDE (H₂S)

WHERE IT IS FOUND

Hydrogen Sulfide is a toxic, flammable, colorless gas. H₂S occurs naturally in crude petroleum and natural gas, and is present in some production fields within NAG. H₂S can also result from the bacterial breakdown of organic matter. Reservoirs can become contaminated with sulfur-reducing bacteria during well workover.

H₂S can also be present in wells and in process streams. H₂S is highly soluble in water, crude and condensate and can concentrate in the headspace of condensate or produced water storage tanks. H₂S is heavier than air and this can cause the gas to settle in low-lying areas such as rig cellars, sumps, dikes, and other poorly ventilated areas such as confined spaces.

HEALTH EFFECTS

The principle hazard of H₂S is death by inhalation.

One breath of H₂S at concentrations of 500 ppm or greater can cause loss of consciousness and possibly death. H₂S has a rotten egg odor at low concentrations, but one cannot rely on sense of smell alone to detect H₂S. At concentrations over 25 - 30 ppm, H₂S can paralyze the nerves responsible for the sense of smell resulting in workers being unaware of potential exposure. The following symptoms have been noted at concentrations between 10 ppm and 300 ppm: itching or irritation of the skin; stomach ache and nausea; burning of the eyes and lungs; headaches; physical fatigue; coughing; and light-headedness.

EXPOSURE LIMITS AND CONTROLS

The BP US NAG action limit for exposure to H₂S is 10 ppm. When working in locations which contain H₂S in the gas stream, the risks associated with H₂S exposure can be managed by utilizing the following practices:

- Participating in the annual H₂S awareness training that is required for all personnel who may be required to work in a known or suspected H₂S environment.
- Looking for danger signage that warn personnel of potential H₂S exposure at all access points to the location.
- Being aware of wind direction, routes of egress and the location of safe briefing areas.
- Using only positive pressure self-contained breathing apparatus (SCBA) or positive pressure air line units with an escape unit in any known or suspected H₂S environment of 10 ppm or greater in the breathing area (This requires additional respiratory protection training).
- Utilizing the required personal monitoring equipment where there is a possibility that H₂S levels may exceed 10 ppm in the breathing zone when working without respiratory equipment or when no fixed monitoring system is available.
- Calibrating personal monitoring equipment according to manufacturer's specifications.
- Utilizing the required standby person when employees may be exposed to greater than 100 ppm H₂S in their breathing zone during the course of their work in operations. OSHA equates the breathing zone as being level with the thief hatch for tank gauging operations. The standby person must be equipped with a SCBA and must wear the SCBA if the potential exists for his exposure to exceed 10 ppm H₂S.
- Using the "buddy system" when responding to an H₂S alarm/leak or during emergency rescue procedures.
- Not leaving H₂S wells unattended during blow-down.

Refer to NAG Onshore U.S. Safe Practices Manual for other H₂S requirements.

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INCIDENT REPORTING

Table 2.0 – Initial Internal Incident Notification and Reporting

Class of Incident	Primary Level Notifications	Secondary Level Notifications		Root Cause Required	Tr@ction Report Required	Lessons Learned Report	Conf. Call or Face-to-face mtg.
	Field Notification to Asset Mgr/Wells TL, PUL, HSSE TL	Phone	Line Notification to BUL, Wells Mgr & Director, HSSE Director, HSSE Ops Mgr				
MAJOR INCIDENT							
MIA (Actual Severity 1 or 2)	Phone	ASAP 1 hour or less	Phone	ASAP 1 hour or less	Yes	Yes	Within 60 days**
HIPO (Actual Severity 3, 4 or 5; Potential Severity 1 or 2.)	Phone	Same Day	Phone	Same Day	Yes	Yes	Within 60 days**
SOR	Phone	No later than Next Work Day	Phone	No later than Next Work Day	Yes	Yes	Within 60 days**
INJURY / ILLNESS INCIDENT							
DAFWC (Actual Safety Severity 3)or Restricted Duty Injury/Illness (Actual Safety Severity 4)	Phone	Same Day	Phone	Same Day	Yes	Yes	Within 60 days**
OSHA Recordable Incident (Actual Safety Severity 3 or 4)	Phone	No later than Next Work Day	Phone	No later than Next Work Day	Yes	Yes	Within 60 days**
First Aid or No Treatment (Actual Safety Severity 5)	N/A	Not required	N/A	Not required	Optional	At HSSE TL Discretion	No

Class of Incident	Primary Level Notifications	Secondary Level Notifications		Root Cause Required	Tr@ction Report Required	Lessons Learned Report	Conf. Call or Face-to-face mtg.	
	Field Notification to Asset Mgr/Wells TL, PUL, HSSE TL	Line Notification to BUL, Wells Mgr & Director, HSSE Ops Mgr						
<u>MATERIAL RELEASE INCIDENT</u>								
CERCLA or SARA Reportable Release (after immediate external reporting)	Phone	No later than Next Work Day	E-mail	At Asset Manager Discretion	Optional	Yes	At HSSE Manager & HSSE TL Discretion	No
Chemical exceeds Reportable Quantity (RQ) or ≥1bbl, whichever is less (includes gaseous, liquid or solid substances)	E-Mail*	No later than Next Work Day	At PUL's Discretion		Optional	Yes	At HSSE TL Discretion	No
Hydrocarbon Spill 1bbl or any oil on waters of the U.S. or a state	E-Mail*	No later than Next Work Day	At PUL's Discretion		Optional	Yes	At HSSE TL Discretion	No
Hydrocarbon spill < 1 bbl.	No	None	None		Optional	Input into a local database monthly. Related action items in Tr@ction - Other Event	No	No
Produced Water/Other Spill exceeding Reportable Quantity (RQ) or ≥1bbl	E-Mail*	No later than Next Work Day	At PUL's Discretion		Optional	Yes	At HSSE TL Discretion	No
Produced Water Spill < 1 bbl.	No	None	None		Optional	Input into a local database monthly. Related action items in Tr@ction - Other Event	At HSSE TL Discretion	No
Uncontrolled Gas Release – Higher Severity (that is not also MIA or HIPO)	E-Mail*	No later than Next Work Day	At PUL's Discretion		Optional	Yes	At HSSE TL Discretion	No
Uncontrolled Gas release – Lower Severity	No	None	None		Optional	Input into a local database monthly. Related action items in Tr@ction - Other Event	No	No

Class of Incident	Primary Level Notifications	Secondary Level Notifications		Root Cause Required	Tr@ction Report Required	Lessons Learned Report	Conf. Call or Face-to-face mtg.
	Field Notification to Asset Mgr/Wells TL, PUL, HSSE TL	Line Notification to BUL, Wells Mgr & Director, HSSE Ops Mgr					
<u>TRANSPORTATION INCIDENT</u>							
Serious Vehicle Accident (SVA) (Actual Safety Severity 1-4)	Phone	Same Day	Phone	Same Day	Yes	Yes	Within 60 days**
Vehicle Incident or Transportation/ Maritime Incident	Phone	No later than Next Work Day	At PUL's Discretion		Optional	Yes	At HSSE TL Discretion
<u>INTEGRITY MANAGEMENT INCIDENT</u>							
Failure of an engineered system -- Higher Severity (that is not also MIA or HIPO)	E-Mail*	No later than Next Work Day	At PSIM Program Manager's Discretion		Optional	Yes	At PSIM Program Manager's Discretion
Failure of an Engineered System – Lower Severity	No	None	None		Optional	Input into a local database monthly. Related action items in Tr@ction - Other Event	No
Operational Excursion – Higher Severity	E-Mail*	No later than Next Work Day	At PUL's Discretion		Optional at discretion of OCM	Yes	Optional at discretion of OCM
Operational Excursion – Lower Severity	No	None	None		Optional	Input into a local database monthly. Related action items in Tr@ction - Other Event	No

Class of Incident	Primary Level Notifications	Secondary Level Notifications			Root Cause Required	Tr@ction Report Required	Lessons Learned Report	Conf. Call or Face-to-face mtg.
	Field Notification to Asset Mgr/Wells TL, PUL, HSSE TL	Same Day	Phone	Line Notification to BUL, Wells Mgr & Director, HSSE Ops Mgr				
OTHER INCIDENT								
DOT Incident	Phone	Same Day	Phone	Same Day	Yes	Yes	Yes	No
Fire/Explosion (that is not also MIA or HIPO)	Phone	No later than Next Work Day	E-Mail*	No later than Next Work Day	Optional at discretion of OCM	Yes	At HSSE Manager & HSSE TL Discretion	Optional at discretion of OCM **
Near Hit/Miss (that is not also HIPO)	N/A	Not required	N/A	Not required	Optional	Yes	If notification is made The HSSE TL Discretion	No
Notice of Violation (NOV)/Incident of Non-Compliance (INC's)	E-Mail*	No later than Next Work Day	E-Mail*	No later than Next Work Day	Optional	Yes	At HSSE TL Discretion	No
OSHA Data Request	Phone	No later than the next day	Phone	No later than the next day	Optional	At HSSE TL Discretion	At HSSE Manager & HSSE TL Discretion	No
PSM Incident Actual Potential	E-mail	Within 48 hours	At Asset Manager Discretion		Yes – initiated within 48 hours	Yes	Yes	No
Security Incident	Phone	Same Day	At Asset Manager's Discretion		Optional	Yes	Optional	No
Unprotected Occupational Exposure above the Action Level for > 15 min.	Phone	Notify Health & IH TL & HSSE TL ***	Phone	At Asset Manager Discretion	Optional	At HSSE TL Discretion	At HSSE Manager & HSSE TL Discretion	No

* E-Mail notification will include the Tr@ction incident number when available

** 60 days from when the incident occurred

*** The IH Team and HSSE TL will determine the need for action and further notification

Note: If notification is left up to a manager's discretion, these incidents will not normally require lessons learned report unless their seriousness qualifies as a SOR

Note: The preferred method for reporting incidents is through this Practice. However, if you prefer to report an environmental incident anonymously, you can do so using the BP Business Conduct Hotline (1-800-225-6141). All reports via the hotline will be referred to the proper persons for timely resolution and the matter will be treated in strict confidence. Duplicate reporting is not necessary.

Note: If incident is classified by more than one category, the more stringent notification requirements apply. Notification to HSSE TL, HSSE Techs and appropriate other individuals to be made if classification changes.

bp



LEAD

Lead

LEAD MANAGEMENT

WHERE IT IS FOUND

Lead has been used for many years in industrial and commercial applications. Lead is commonly added to industrial paints because of its characteristic to resist corrosion. The requirements of this safe practice apply to all maintenance, construction, or demolition work at BP U.S. North America Gas (NAG) onshore facilities and well sites involving materials that may contain lead. This means any paint or coating, that when tested, contains greater than or equal to 0.06 wt%, 600 ppm or $> 0.1 \text{ mg/cm}^2$ lead when dry. Job tasks include the removal or application of lead based paints, performing Hot Work on any metal surface containing lead, handling lead contaminated materials, machining lead containing metals, or any other maintenance or construction task involving the potential exposure to lead. For detailed procedures in the management of lead exposure, refer to the BP NAG and DW Lead Operations and Maintenance Manual.

HEALTH EFFECTS

Human lead exposure occurs when dust and fumes are inhaled and when lead is ingested via lead-contaminated hands, food, water, cigarettes, and clothing. Lead entering the respiratory and digestive systems is released to the blood and distributed throughout the body. Initial onset of lead poisoning usually results in abdominal pain and cramps, insomnia, and irritability or anxiety.

GENERAL REQUIREMENTS

Before maintenance, construction, abatement, or demolition work is to begin, the materials involved in the job must be inspected to determine the presence or absence of lead-containing materials by collecting a paint chip sample or using an XRF-Lead Paint Analyzer.

Exposure Limits and Controls

The Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) for lead is fifty micrograms per cubic meter of air (50 ug/m^3) averaged over an 8-hour period. OSHA Lead Standards require employers conducting construction activities involving lead or lead containing materials to:

- Perform industrial hygiene monitoring;
- Use engineering and work practice controls;
- Develop written compliance programs;
- Provide protective clothing and respiratory protection, equipment and hygiene facilities;
- Conduct employee training;
- Provide medical surveillance to any employee exposed to greater than 30 ug/m^3 over an 8-hour time-weighted average (TWA) more than 30 days/year; and
- Post signs at lead work areas where exposures exceed 50 ug/m^3 over an 8-hour TWA to establish regulated areas. A regulated area is an area of appropriate distance from the work location, based on the type of work being conducted, that is barricaded and has limited entry with the appropriate signage.

Regulated Activities / Tasks

Specific activities/tasks covered by the regulatory standards include:

- Abrasive blasting and cleanup and removal of abrasive blasting material and containments;
- Welding, grinding, cutting, and torch burning;
- Manual scraping, sanding, and structure demolition;
- Power tool cleaning (wire wheel buffing, needle guns, etc) and heat gun applications;
- Rivet busting and use of lead pots; and
- Spray painting onto any material or coating containing lead.

KEY RESPONSIBILITIES FOR OPERATING SUPERVISORS

- Must verify that personnel receive training appropriate to their job responsibilities.
- Must verify that proper risk evaluations are conducted to identify potential activities that may be associated with lead-contaminated material and that the appropriate resources and equipment to conduct any such lead abatement activities are provided.
- Must verify that monitoring of any vessel or confined space associated with any lead abatement activity is conducted before personnel enter and that the appropriate permit(s) are completed according to the NAG Confined Space Entry Practice.
- Must verify that all sampling and/or monitoring conducted to evaluate the potential for lead exposure are documented and retained for the lifetime of the facility.

PROCEDURE / PROCESS

Lead Operation and Maintenance Program - Minimum Requirements

- Inspect coatings and metals for lead content prior to work being started.
- Follow a written compliance program prior to work involving lead containing materials.
- Designate an onsite "lead competent person" for the job.
- Train BP employees who will be working with lead containing materials initially and annually thereafter. Contracted services must be in compliance with all applicable regulations.
- Confirm that employees who are required to wear a respirator are medically approved, fit tested and trained on the use of the respirator annually.
- Confirm that employees who will be working in "Lead Regulated Work Areas" receive medical surveillance initially and additional monitoring on a frequency based on their exposure level.

- Communicate existence of lead work area to other employees and contractors in the area before start of job.
- Provide hand and face wash facilities.
- During the job, provide clean change areas if exposures are greater than 50 ug/m³ 8-hour TWA, and provide showers where feasible.

Waste Handling

- All lead contaminated waste generated during any lead work will be collected (i.e. plastic sheeting will be placed under the work) and placed in 35 gallon plastic hazardous waste drums.
- Any waste drum containing lead contaminated personal protective equipment and waste shall be labeled in accordance with state and federal regulations.
- If the waste is found to be hazardous, the Operating Center generating the waste shall follow the procedures found in the facility Waste Management Manual.

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LIFTING OPERATIONS
(Cranes, Hoists, Slings and Other
Lifting Equipment Inspection
and Operation)

LIFTING OPERATIONS

(Cranes, Hoists, Slings and Other Lifting Equipment Inspection and Operation) (K0000000439)

1.0 PURPOSE / SCOPE

The purpose of this document is to establish the minimum requirements for safe lifting operations and applies to the NAG SPU facilities and BP controlled operations, construction sites, company leases, drilling and well sites and pipeline right-of-ways. It applies to hoisting, lifting and rigging equipment, and operations. Operations covered within the scope of this process are those associated with lifting operations involving mobile cranes, overhead cranes, drilling and work over rigs, backhoes, and gin pole trucks.

Ratchet and pawl or lever-operated hoists, such as a come-along, are not included in this Practice. Only fit-for-service types of equipment shall be used for lifting. Refer to the manufacturer's requirements for the use, inspection, and maintenance of this type of equipment.

In addition to this Practice, each Operations Center (OC) shall have an OC Lifting Champion who shall liaise with the NAG - SPU Technical Lifting Authority.

2.0 DEFINITIONS

Accountable Person: A person in the organization who has ultimate responsibility for a lift.

Anti-two Block: Equipment which prevents the load blocks from coming into physical contact with the head or crown blocks, which can result in damage to the lifting equipment and a dropped load.

Anti-two Block Function Test: A procedure to cause the Anti-two block system to be engaged prior to use under controlled conditions with no load, to determine that the system shall perform as designed and stop the lifting equipment from operating to prevent damage to the lifting equipment.

Authorized Person: An individual authorized by the Person in Charge (PIC) to perform tasks.

Competent Person: A person being capable by training, through acquired knowledge, demonstrated skills and experience, of identifying existing and predictable hazards in surroundings, working conditions, or behaviors and to have the authorization to take prompt corrective measures to eliminate them.

Crane: A fixed or mobile machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism being an integral part of the machine.

Critical Lift: A lift that presents a risk of significant property damage, or high potential of personal injury, or a lift designated as a critical lift by the OC because of special circumstances or hazards.

The list of critical lifts includes, but is not limited to:

- Lifting where the equipment operator cannot see the load and/or signal person.
- Lifting directly over energized or pressurized equipment.
- Lifting where energized electrical power lines are within twice the maximum swing radius of the crane, plus the required clearance.
- Using two or more cranes/lifting devices to tandemly lift one load. Example: using any combination of hoist devices together, including forklifts or gin pole trucks to lift an object (except for multiple lifting devices for pipeline operations).
- Lifts exceeding 80% of the lifting equipment capacity.
- Lifts to be made over occupied facilities.
- Lifting of personnel.

Note: Boatswain chair personnel lifts on drilling/workover rigs shall be managed by site specific lifting plans, and shall conform to 29 CFR 1926.500 Fall Protection.

Gin Pole Truck: A winch truck equipped with a pair of poles, and hoisting equipment for use in lifting.

Hoist: An apparatus which may be a part of a crane, exerting a force for lifting or lowering

Incidental Lift: The use of backhoes, track hoes, front-end loaders, side booms, and similar earth moving equipment for lifting according to their design. Such use of this equipment shall comply with the equipment manufacturer's requirements, specifications, and designs for lifting (for example, repositioning a flow line/pipeline in an excavation).

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s). The JSEA shall be discussed with all personnel involved before Lifting Operations begins.

Non-critical Lift: A lift that is not a critical lift and that may or may not require a permit.

Mobile Crane: A crane consisting of a rotating or fixed superstructure with power plant, operating machinery, and boom mounted on a base consisting of an automotive truck equipped with a power plant for travel or a platform equipped with axles and rubber-tired wheels or crawler treads for travel. Mobile cranes include wheel-mounted cranes, truck cranes, and crawler cranes, but do not include gin pole trucks.

Overhead Crane: A crane with a single or multiple girder movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead fixed runway structure.

Rig: The derrick and mast, draw-works, and attendant surface equipment of a drilling or workover unit.

Two-block Damage Prevention Feature: a system that will stall when two-blocking occurs without causing damage to the hoist rope or crane machinery components.

3.0 GENERAL REQUIREMENTS

An anti-two block device or a two-block damage prevention feature shall be installed on all cranes and shall be kept well maintained and functioning (gin pole trucks are not required to have this device, see section 5.4 Mobile Cranes). For drilling/workover operations refer to the DWOP requirements. **Bypassing this device for any reason is prohibited.**

Cranes, chain hoists, and lifting equipment shall be tested, inspected, and maintained in accordance with the manufacturer's recommendations.

Only competent operators, lift leaders, and riggers shall perform lifting operations.

Backhoes, track hoes, front-end loaders, side loaders, and similar earth moving equipment may be used only for incidental lifting for which they are designed. Such use of this equipment shall comply with the equipment manufacturer's requirements, specifications, and designs for lifting.

The command STOP may be given by anyone and shall be obeyed by everyone including the crane or hoist operator.

Lifting shall not commence until a visual assessment of the lift has been completed and a lift leader has determined the lift method and equipment are safe and ready for use. In the case of a mobile crane, this would be a crane operator.

Lifting shall not commence if the load exceeds the dynamic and/or static capacities of the lifting equipment.

Lifting shall only be performed when loads are within the capacity of the lift equipment per configuration of use.

Lifting shall not commence unless safety devices installed on lifting equipment are operational.

Lifting shall not commence until a Competent Person has visually examined the lifting devices and equipment prior to use. This includes slings, hooks, rigging hardware, and below the hook lifting devices.

Lifts of personnel utilizing man baskets shall conform to 29 CFR 1926.550 (g), ASME B 30.23.

Boatswain chair usage for lifting personnel shall require a site specific plan meeting minimum requirements of the critical lift and shall not require the area lifting authority to be notified on each lift.

This Practice does not cover, for example, manual lever chain hoist or chain fall. However, each OC utilizing a lever chain hoist and chain fall shall have a system in place to inspect and maintain such equipment.

4.0 KEY RESPONSIBILITIES

Area Authority (AA): The Area Authority shall be appointed as a part of the Control of Work process and shall be the person responsible for assigning an Issuing Authority and Performing Authority.

Crane or Hoist Operator: One who has appropriate training (crane certificate of competency needs to be available on request), as outlined in this Practice and with assurance by the Area Authority (AA), and has demonstrated knowledge, competence, and skill in the safe operation of the lifting equipment to be used.

Rigger: One who has appropriate training, as outlined in this Practice and with assurance determined by the Area Authority (AA), and has demonstrated knowledge, competence, and skill in the safe operation of the rigging equipment to be used.

Designated Lift Leader: One who has sufficient training, knowledge, and experience to confirm that a lift is conducted in a safe manner, equipment is in safe condition, equipment is set up and positioned properly, and proper rigging equipment and techniques are used. This person is responsible for the overall lifting operation and shall be trained to the level of competence consistent with their assigned role. The Lift Leader shall be considered the Issuing Authority (IA) and has the responsibility for the issuance of the lifting permit.

Performing Authority (PA): The Performing Authority is responsible for activities carried out on the work site under this Practice and is accountable to the IA for the safe delivery of work activity. The PA may be performing a task or may be supervising a group that is performing a task. The PA may also be the IA if competent in the permit Practice in question.

NAG SPU Lifting Authority: Designated single point of contact to be responsible for consistency and uniformity in application of lifting procedures throughout the NAG Onshore SPU.

Operations Center Lifting Champion: Designated lifting subject matter resource within the asset to coordinate the implementation of the various aspects of this Practice. The Lifting Champion has overall accountability to the OCM or Wells Superintendent for confirming work activities are conducted with associated Practices and permit requirements and with local Operating Procedures.

Signal Person: Has the responsibility of observing the load and lift and providing direct instructions to the crane/hoist operator. The signal person shall have sufficient knowledge and experience to confirm that the lift is not maneuvered in a manner creating a hazardous situation.

Supervisors of crane, hoisting, rigging and lifting operations: Shall be knowledgeable of the types of operations under their supervision and the operational hazards of those activities. Supervisors are not required to be competent operators or riggers per this Practice.

Person in Charge (PIC): The PIC is appointed by the AA to be responsible for coordinating among multiple PAs and IAs working at one site to confirm safe delivery of all work activities. The PIC is an onsite individual that has working knowledge of all work activities being performed by all groups/personnel working on location. The PIC can be the AA, IA, or one of the PAs.

5.0 PROCEDURE

This section identifies the procedures for lifts, critical lifts and incidental lifts.

5.1 Documentation

5.1.1 Lifting Permit

A Lifting Permit shall be completed prior to operations using a mobile crane (excluding forklifts and auto cranes) or any lift determined to be a Critical Lift.

All line items on the permit shall be completed. The permit shall be signed by:

- Qualified Crane operator,
- Designated Lift Leader, and
- Designated Rigger.

Expired Lifting Permits shall be kept on file at the OC for at least one month after the closure date.

5.1.2 Critical Lift

The designated lift leader (IA) in charge of each critical lift shall prepare the following documents:

- Critical lift plan for safe performance of the lift (see Sample Critical Lift Plan),
- Job Safety Environmental Analysis (JSEA),
- Lifting permit (see Sample Lifting Operations Permit), and
- A simplified diagram of the lift and rigging.

The critical lift plan and JSEA shall be communicated to, discussed with and approved by the Area Authority familiar with this Practice and all personnel involved in the critical lift.

5.1.3 Required Documents

- All lifting operations require a JSEA to be performed prior to execution.
- All permits and lift plans shall be complete.
- Not Applicable (NA) is an acceptable response on the documentation, when appropriate.

		Required Documents			
		JSEA	Lift Permit	Critical Lift Plan	Manbasket Checklist
Lift Type	Non-Critical	X			
	Mobile Crane	X	X		
	Critical	X	X	X	
	Personnel Hoisting	X	X	X	X

Note: Lifts of more than one lift type require the documents of all lift types involved.

5.2 General Safety Rules

5.2.1 Standard Hand Signals

- One individual shall be designated as the Signal Person to communicate with the operator. This individual should be positioned to have continuous visual contact with the operator. If visual contact cannot be maintained, a Critical Lift Assessment and Plan shall be completed.
- The Signal Person shall wear an orange vest or similar identifier.
- Hand signals to the mobile crane/lift equipment operator shall be in accordance with the standards prescribed in ASME/OSHA regulations for the type of crane being used.
- An illustration of the signals shall be available at the job site for review (See Attachment 1: Standard Hand Signals for Crane Operators)
- If line of sight with the Signal Person is not possible, voice communications equipment (telephone, radio, or equivalent) shall be used.
- Constant visual and/or audio communication is always required between the operator and the signal person.
- Some special operations may require addition to or modification of the standard signals. For such cases, these special signals shall be agreed upon and thoroughly understood by both the person giving the signals and the operator prior to commencement of work, and shall not be in conflict with the standard signals.

- If communication is interrupted or lost, the operator shall stop moving the load immediately until communication is re-established.

5.2.2 Moving and Lifting the Load

- **All lifts** shall have a JSEA. One JSEA may cover multiple similar lifts (for example, unloading a truckload of drill pipe).
- In the case of personnel changes during the lift and/or changes in rigging and/or setup (for example, change to different size of rigging components), the JSEA shall be reviewed prior to proceeding with the work.
- When multiple personnel are involved in a lift, there can only be one designated Signal Person.
- Hoisting and rigging operations for lifts require a Designated Lift Leader, who shall be present at the lift site during the entire lifting operation. The lift leader designation may be by written instructions, specific verbal instructions for the particular job, or clearly defined responsibilities within the crew's organizational structure. If only one person is making the lift, that person is the Designated Lift Leader. The Designated Lift Leader shall make certain the load is correctly rigged.
- When eye bolts or other lifting attachments are used, the Performing Authority shall verify that they are of sufficient strength and used in accordance with the manufacturer's requirements. Note: Side loading of eye bolts is prohibited.
- Non-essential personnel in the vicinity of the lifting operations who are not directly involved with the lift shall stay out of the area of maximum boom radius.
- Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, shall be barricaded in such a manner as to prevent a worker from being struck or crushed by the crane.

- Loads shall not be carried over people. Personnel should not pass under suspended loads or the loaded crane boom.
- With the exception of rigging the load, work on suspended loads is prohibited.
- No one shall be on the load, hook, or rigging during hoisting, lowering, or swinging of the load or traveling of the lifting equipment except when lifting personnel in approved equipment.
Note: Personnel Lifts are Critical Lifts.
- Suspended loads shall not be unattended unless physically secured to prevent unintended movement.
- Tag lines are the preferred method to control the load. The need for tag lines should be evaluated in the lifting JSEA. Decision to not use tag lines shall be approved by lift leader and additional risks associated with handling a load without tag lines shall be addressed in the JSEA.
- The load weight should include the weight of the load, block, ball, lattice extension, jib, hoist rope, rigging, and any other weight that would affect the gross load.
- Placing hands on loads should be avoided. Where loads have to be physically guided, or stabbed into place by hand (for example, engine block, BOP stack, lubricator, and injector head), precautions shall be implemented to minimize exposure to personnel.
- The load shall be secured and balanced in the sling or lifting device before it is lifted more than a few inches.
- During the planning of the lift, if clearances from structures are a concern, an individual shall be stationed to observe the clearance and warn of any impeding danger.
- If the potential exists for people to move into the area of the lift, a person shall be assigned to control access to the area.

5.2.3 Lifts

- Lift leader shall be present at the lift site during all lift operations.
- Do not lift loads when winds create an unsafe or hazardous condition, regardless of wind speed. The JSEA shall be re-evaluated when the wind speed exceeds 20 MPH and lift operations suspended when wind speeds reach 30 MPH for cranes utilizing booms.
- If visibility is impaired by conditions such as dust, snow, rain, fog, or darkness, lifting operations shall be suspended.
- With the exception of rig floor operations, personnel shall be kept clear of loads about to be lifted.
- The load shall not exceed the dynamic or static capabilities of the lifting equipment. An evaluation of crane capacity shall be completed for each lift and kept for the duration of the job. Loads exceeding 80% of the gross capacity of the crane configuration that is required to complete the lift shall be considered a Critical Lift.
- Power lines within twice the maximum swing radius of the crane plus the minimum required voltage clearance constitute a Critical Lift. Minimum required voltage clearances referenced in table below:

Normal Voltage (phase to phase)	Minimum Required Clearance
To 50 kV	10 ft.
51 to 200 kV	15 ft.
201 to 350 kV	20 ft.
351 to 500 kV	25 ft.
501 to 750 kV	35 ft.
751 to 1000 kV	45 ft.

5.3 Overhead Cranes and Hoists

5.3.1 Maintenance Program

A preventive maintenance program based on the crane manufacturer's recommendations shall be established and maintenance documentation shall be maintained.

5.3.2 Inspection Program

Manufacturer's recommendations for inspections and equipment condition shall be followed. Inspections of overhead hoists/cranes shall include, but not be limited to, the items listed in Table 1: Overhead Hoist/Crane Inspection Requirements). Particular attention shall be paid to the condition and correctness of sheaves used on lifting equipment. Written crane/hoist inspection verification shall be available upon request.

Overhead hoists shall be inspected as follows:

- Prior to use (documentation is not required),
- Annually (documentation is required), and
- Deficiencies or hazards found during an inspection shall be corrected or repaired before the overhead crane or hoist is used.

The Area Authority is responsible for verifying that these maintenance, inspection, and testing programs are developed, implemented and kept in compliance.

5.4 Mobile Cranes

- Mobile cranes shall have an accurate load-rating chart affixed to the unit in plain view of the operator when the crane is being used. A crane capacity evaluation shall be completed by the Performing Authority before a lift is attempted. The evaluation shall include the gross load, boom radius, boom angle, boom length, and jib length. The crane load chart should be consulted to obtain the gross capacity percentile of the crane as configured.

- Load tests - Prior to initial use, new, extensively repaired, or altered mobile cranes and hoists shall be load tested. A report confirming the load rating of the equipment shall be furnished and kept on file. Tests shall not exceed 110 percent capacity of the rated load. The crane owner is responsible to perform the testing and provide documentation of such tests.
- Mobile Cranes shall have an Anti-Two block system or a two-block damage prevention feature in place that when activated disengages all crane functions whose movement can cause two-blocking. Function tests shall be conducted daily prior to use by the Performing Authority and after crane has been turned off and left unattended for any length of time. These systems cannot depend on human interaction to work (such as depending on the alarm to sound and the operator stopping in time).
- Anti-Two Block system or a two-block damage prevention feature and load-rate charts (mounted on equipment) may not be available for some equipment listed, such as gin pole trucks and side boom equipment. However, the elimination or control measure of identified hazards shall be documented on the JSEA or Risk Assessment.

5.4.1 Maintenance Program

A preventive maintenance program based on the crane manufacturer's recommendations shall be established and maintenance documentation shall be maintained.

5.4.2 Inspection Program

Manufacturer's recommendations for inspections and equipment condition shall be followed. Inspections of mobile cranes shall include, but not be limited to, the items listed in Table 2: Mobile Crane Inspection Requirements).

A written annual crane /hoist inspection verification shall be available upon request. At a minimum, cranes shall be inspected as follows:

- Prior to use (documentation is not required),
- Annually (documentation is required), and
- Deficiencies or hazards found during an inspection shall be corrected, repaired, or have mitigation plans developed before the lifting equipment is placed into service. Work on lifting equipment shall be done by authorized personnel.

This maintenance, inspection, and testing program is the responsibility of the equipment owner or user. The contract company that brings the equipment to BP property shall confirm that an adequate program is in place and provide evidence of such to the Area Authority (AA) or designated representative.

5.6 Wire Ropes, Chains and Slings

- Rigging shall be performed by competent riggers
- Chain slings used for lifting shall be grade 80, or better, alloy steel chain.
- The use of wire rope, chains, slings, and associated fittings shall be in accordance with the manufacturer's recommended guidelines.
- Inspection shall be conducted by personnel competent in sling care, use, maintenance, and inspection.
- Lifting equipment shall be visually inspected for damage before use. Documentation of this "before use" inspection is not required.
- Synthetic fabric slings, wire rope slings, and steel alloy chain slings shall have a legible load rating attached. If the load rating is missing or cannot be read, the sling shall be taken out of service.
- Any sling found defective shall be removed from service immediately and repaired and/or destroyed (Refer to the manufacturer's specifications on when a sling is defective).
- Prior to the initial use, any new, repaired, or reconditioned chain sling shall be proof-tested by the manufacturer and applicable certification kept on file.

- Knots are never to be used with any sling, chain, or wire rope.
- Slings shall not be pulled from under a load when the load is resting on the sling.
- Hands and fingers shall never be placed between the sling and the load.

5.5.1 Inspection Program

Inspections of slings, shackles, eyebolts, and wire ropes shall be conducted by a Competent Person and shall include, the items listed in Table 3: Sling and Rigging Attachment Inspection Requirements). Alternatively, the manufacturer's equipment specific checklist can be utilized provided it is as comprehensive as Table 3: Sling and Rigging Attachment Inspection Requirements.

Written sling inspection verification shall be immediately available. Slings shall be inspected:

- Prior to use (documentation is not required),
- Annually (documentation is required), and
- Deficiencies or hazards found during an inspection shall be corrected before the slings, shackles, eyebolts, and wire ropes are placed into service.

The Area Authority (AA) is responsible for verifying that these maintenance, inspection, and testing programs are developed, implemented and kept in compliance.

5.5 Drilling and Well Servicing Rigs

The contract company shall confirm that Drilling and Well Servicing rigs are maintained and inspected in accordance with the manufacturer's and American Petroleum Institute's (API's) specifications. Inspection and maintenance documentation shall be maintained by the contractor and made available for review immediately upon request.

6.0 TRAINING

For additional training information, refer to
NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

Safety and health regulations require that only trained and qualified/competent personnel operate cranes, hoists, and lifting equipment and perform rigging. OC, contractors, and subcontractors shall provide trained crane operators, signalers, and riggers.

6.1 Lift Leader Competency (Issuing Authority)

Lift Leaders shall be trained to the level of competency consistent with their assigned role. To be competent as a lift leader, the person shall:

- Be designated as a competent Lift Leader by their employer,
- Understand the requirements associated with Rigger/Signaler and Crane/Hoist operator,
- Complete/Pass a formal Lifting training program or equivalent,
- Understand the Issuing Authority (IA) position responsibilities, and
- Have responsibility for the issuance of the lifting permit.

6.2 Crane Operator Competency (Performing Authority)

To be competent as a crane operator, the person shall:

- Be designated as a competent operator by their employer to operate cranes,
- Possess certification as required by jurisdictional agency,
- Meet the requirements of a competent rigger and signaler,
- Complete an actual or simulated practical operating skill evaluation test for the specific type of equipment to be operated,

- Demonstrate the ability to read and comprehend load capacity charts in the language of the crane manufacturer's operation and maintenance instruction materials,
- Satisfactorily complete an evaluation on load chart usage that covers a selection of the operating configurations for the specific type of equipment,
- Demonstrate knowledge of inspection requirements for equipment, including safety devices, being operated,
- Demonstrate knowledge of the PA position, and
- Act as the Performing Authority (PA).

6.3 Rigger / Signaler Competency (Performing Authority)

To be competent as a rigger, the person shall:

- Be designated as a competent rigger by their employer to perform rigging activities,
- Complete a formal rigging training program or equivalent,
- Demonstrate the ability to read and comprehend sling capacity charts,
- Demonstrate the ability to perform the pre-use, initial, and annual rigging inspections as described in this Practice,
- Demonstrate knowledge of the PA position, and
- Act as the Performing Authority (PA).

6.4 Hoist Operator Competency (Performing Authority)

To be competent as a hoist operator the person shall:

- Be designated as a competent operator by their employer to operate hoists.
- Meet the requirements of a competent rigger and signaler.
- Receive practical operations training.

- Demonstrate the ability to perform the pre-use, initial, and annual inspections as described in this Practice.
- Demonstrate knowledge of the PA position, and
- Act as the Performing Authority (PA).

6.5 Refresher Training

Operator, rigger, and signaler shall have refresher training every 3 years.

In addition to the 3 year requirement, refresher training in relevant topics shall be required when an individual:

- Has been observed to operate in an unsafe manner, or
- Has been involved in an accident or near-miss incident.

Refresher training includes satisfying the requirements for competency.

Training and record keeping for personnel are the responsibility of the employer. Records shall be available for review upon request.

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Lifting Operations document in the Health & Safety Manual on the web.

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LOCKOUT / TAGOUT

Lockout / Tagout

LOCKOUT / TAGOUT (0000000445)

1.0 PURPOSE / SCOPE

The purpose of this document is to establish minimum Lockout/Tagout requirements to safely control energy when servicing or performing maintenance on machines and equipment from which the unexpected energization, start-up, or the release of stored energy could cause injury or equipment damage. This document applies to North America Gas (NAG) Onshore US Operations.

2.0 DEFINITIONS

Affected Employee: A person who works in areas or on equipment or machines where energy sources are locked or tagged out but who is not directly involved in the isolation activity.

Authorized Employee: A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment.

Double Block & Bleed (DBB): Double Block and Bleed (DBB) consists of the closure of two block valves in series with an intermediate bleed valve.

Energy Isolating Device: A mechanical device that physically blocks or isolates energy.

Energy Source: Any electrical, mechanical, hydraulic, pneumatic, gravity, chemical, radiation, thermal, or other source of energy that could cause injury or harm to people or the environment.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s).

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position, and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Note: Tags and their means of attachment should be made of materials which will withstand the environmental conditions encountered in the workplace. Tags are essentially warning labels affixed to energy isolating devices and do not provide the physical restraint on those devices that is provided by a lock. Tag attachment devices shall be of a non-reusable type, attachable by hand, self-locking and non-releasable with a minimum unlocking strength of 50 pounds.

3.0 GENERAL REQUIREMENTS

3.1 Each Operations Center Manager (OCM), Wells Superintendent and Major Projects Manager will coordinate and is accountable for the development of equipment-specific lockout/tagout procedures following the requirements outlined in this document. These procedures, at a minimum, shall include the following safety control measures: lock boxes; company identification (company name); name and phone number of the person who placed the lockout device on the energy isolating device. Recommended safety control measures such as, specific color locks to identify each craft and company identification are optional.

3.2 Lockout/tagout procedures should be developed with guidance from a Health and Safety Coordinator.

3.3 All energy sources associated with equipment shall be locked out/isolated in a position that isolates the workers from the hazardous energy when maintenance/servicing work is being performed.

3.4 An Authorized Employee shall be responsible for confirming that all equipment and energy sources associated with a specific task and job are properly locked out and isolated before starting work.

3.5 The requirements in this document do not apply to work on cord and plug connected electrical equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by:

- the unplugging of the equipment from the energy source, and
- by the plug being under the exclusive control of the person performing the work.

4.0 KEY RESPONSIBILITIES

4.1 Control of Work (CoW) Responsibilities:

Key responsibilities for the following CoW roles are provided in the NAG SPU Control of Work Policy:

- Area Authority (AA)
- Issuing Authority (IA)
- Performing Authority (PA)
- Person in Charge (PIC)

Note: Roles and responsibilities required to operate within the Control of Work Policy and associated procedures shall be identified, communicated and recorded within the local competent persons registry. Consult your local leadership for job specific identified roles.

4.2 Affected Employee: A person who works in areas or on equipment or machines where energy sources are locked or tagged out but who is not directly involved in the isolation activity.

4.3 Authorized Employee: A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment.

5.0 PROCESS

5.1 Lockout/Tagout of Equipment

- A. Before work begins, a Job Safety Environmental Analysis (JSEA) shall be conducted.
- B. Authorized Employees involved in lockout/tagout must be knowledgeable of the type and amount of the energy, the hazards of the energy to be controlled, and the method or means to control the energy before turning off or on a machine or equipment.
- C. Each Affected Employee shall be notified before a job or task is started to discuss the lockout/tagout process and the prohibition regarding attempts to restart or reenergize equipment that has been locked/tagged out.

- D. Machinery or equipment shall be turned off or shut down using established local procedures. An orderly shutdown should be used to avoid any additional or increased hazards to onsite personnel as a result of equipment shutdown.
- E. All energy isolating devices needed to control the energy to machinery or equipment shall be physically located and operated, wherever appropriate, to isolate the machinery or equipment from the energy source(s).
- F. Each Authorized Employee (except as defined in a Group Isolation procedure) shall lock out all equipment to be worked on with a personal lock and apply a DO NOT OPERATE tag that is legibly dated and signed by the person performing the work.
- G. No lockout device shall be affixed without a tag indicating the name of the Authorized Employee that locked out the equipment, the date and reason it was locked out.
- H. A tagout procedure may be used on an energy isolating device only when the system is unable of being locked out. The tagout device shall be attached at the same location that the lockout device would have been attached. The Area Authority (AA) shall be notified whenever a tagout device is used in place of a lockout device. The Area Authority shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.
- I. **Group Isolation:** If more than one group is working on the same equipment (including different maintenance crafts), each Authorized Employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when the Authorized Employee begins work, and shall remove those devices when the Authorized Employee stops working on the machine or equipment being serviced or maintained.

- J. Following the application of lockout and/or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.
- K. The Person in Charge (PIC) shall check the worksite to confirm that all personnel have been safely positioned or removed and the equipment tested to verify that it is properly locked out and will not operate.
Note: The Person in Charge (PIC) shall confirm that timing devices and delayed starts have been isolated. **Lock, Tag, Clear, and TRY**
- L. After the job or task has been completed, the individual responsible for the equipment shall confirm that the operating device or selector switch has been returned to its normal operating position.
- M. At the beginning of each shift, or after any extended absence from the job (breaks or meals), any Authorized Employee who have equipment locked out and/or tagged out shall check the equipment and the disconnecting device to confirm that all equipment is safe to work on and was not tampered with during their absence.

5.2 Generic Energy Isolation Methods: The following methods may be used as part of developing site-specific and equipment-specific lockout/tagout procedures:

A. **Electrical** (motor controllers, capacitors, circuit breakers):

1. Shut down the equipment using first the selector switch and then the master disconnect.
2. Confirm that all power sources are locked and tagged out.
3. When working on or near exposed de-energized electrical equipment an Authorized Employee using proper test equipment shall confirm that all circuits have been de-energized.
4. If additional energy sources are present, follow the applicable method of energy isolation listed in this section.

B. **Pneumatic** (starting air, control valves, instrument air):

1. **Identify** the system to be isolated.
2. **Isolate** block valves upstream and downstream of the section.
3. **Release** pressure and maintain a zero energy state using a controlled bleed-off.
4. Devices such as chains, energy isolation air valves, shutoff valves and/or locks shall be used to isolate the energy source.
Disconnecting the line is the preferred means of isolation.
5. If additional energy sources are present, follow the applicable method of energy isolation listed in this section.

C. Hydraulic (valve actuators, presses):

1. **Identify** the system to be isolated.
2. **Isolate** the system.
3. **Release** the pressure and maintain a zero energy state.
4. Devices or methods such as chains, energy isolation air valves, shutoff valves, locks or , disconnecting lines shall be used to isolate the energy source.
5. If additional energy sources are present, follow the applicable method of energy isolation listed in this section.

D. **Fluids and Gases** (piping systems, vessels, production/process equipment, and storage tanks):

1. **Identify** the system to be isolated.
2. **Isolate** all inlet and outlet piping, in order of preference, by inserting blinds, disconnecting or use of double block and bleed.
3. All new and refurbished equipment should be designed and installed with the ability to use a double block and bleed method.
4. **Release** the pressure and maintain a zero energy state.
5. If additional energy sources are present, follow the applicable method of energy isolation listed in this section.
6. A single block valve may be used only if a documented risk assessment has been performed prior to using a single block valve. Local procedures shall be developed to allow work behind a single block valve.

Single Block Valve Guidance Document and Sample Templates (K0000001821)

provides guidance and 'sample templates' for risk evaluation and authorization to perform work behind a single block valve. (See Section 7.0, Associated Documents/Links Table in the master Lockout/Tagout document in the Health & Safety Manual on the web)

Note: Consideration should be given to depressurizing the entire system if possible; however, risks involved in re-pressurizing the systems, such as systematic purging, relighting gas fired vessels and flammable mixtures in air shall be evaluated prior to complete depressurization.

E. **Mechanical** (pumping unit, counterweights, flywheels):

1. Release all stored mechanical energy and/or isolate the energy source. Be aware of gravity, springs, tension, and other sources of energy that are not always obvious.
2. Devices such as blocks, pins, or chains should be used to restrain energy when equipment, such as pumping units, cannot be brought to a zero potential energy state. **Do not depend on brakes alone to secure equipment.**
3. Locks and tags shall be used to lock out and tag out mechanical energy.
4. If additional energy sources are present, follow the applicable methods of energy isolation listed in this section.

5.3 Restoring Equipment

- A. After each phase of the work is complete, the locks for that crew may be removed only after:
1. Communicating to the Person in Charge,
 2. Confirming that the work area has been inspected, nonessential items removed, and machine or equipment components are operationally intact,
 3. Confirming that all personnel are safely positioned or removed,
 4. The Authorized Employee shall remove the last lock, remove the "Do Not Operate" tag, and notify the individual responsible for the equipment that the repairs are complete and the equipment is ready for service, and

5. After lockout and/or tagout devices have been removed, and before a machine or equipment is started, Affected Employees should be notified that the lockout and/or tagout devices have been removed.
- B. Each lockout or tagout device shall be removed from each energy isolating device by the person who applied the device. When the Authorized Employee who applied the lockout or tagout device is not available to remove it, the device may be removed only under the direction of the Person in Charge (PIC).
- C. A site-specific written procedure for the removal of an employee's lock shall be developed. The specific procedure shall provide control measures to protect the Authorized Employee during the removal of the device. The specific procedure may include, but is not limited to, the following elements:
 1. Confirmation that the job has been completed and no personnel remain in the affected area.
 2. Confirmation that the Authorized Employee who applied the lock is absent and unavailable to remove his/her lock.
 3. The Person in Charge (PIC) shall contact the Authorized Employee to inform them that their lockout/tagout device has been removed before the Authorized Employee returns to the worksite.
 4. After steps C. 1, 2 and 3 have been completed, the locking device and/or tag may be removed.
 5. When returning to work, the Authorized Employee should be informed of the work that required their lockout/tagout to be removed during their absence.
 6. The removal of a personal lock other than the person who installed it shall be documented and maintained in accordance with the site specific policy.

- D. The Authorized Employee restoring energy to the equipment shall:
1. **Inspect** the work area to confirm that nonessential items (e.g., tags, tools, and etc.) have been removed.
 2. **Confirm** that the equipment components are operationally intact,
 3. **Survey** the work area to confirm that all onsite personnel are accounted for and in a safe area, and
 4. **Notify** affected employees that lockout/tagout device(s) have been removed.

5.4 Periodic Inspection

- A. Each Operating Center shall coordinate with the Wells operations and Major Projects operations to conduct an annual inspection of each site lockout/tagout procedure to confirm that procedure(s) are adequate and understood. For the purpose of the inspection, grouping of individual procedures is permitted as long as the group inspection relates to similar types of machines or equipment. The inspection shall be documented.
- B. The annual inspection shall be performed by an Authorized Employee other than the one utilizing the energy control procedure being inspected. This shall include a review between the person performing the inspection and each worker using the lockout/tagout procedure being inspected. Following the inspection, the review can be discussed with personnel who participate in the lockout/tagout program or who may be affected by this program through documented safety meetings.
- C. Annual inspection(s) shall be conducted to correct any deviations or inadequacies identified. Recommendations addressing deviations, inadequacies, or program enhancements shall be tracked per local procedures.

Lockout/Tagout Inspection Checklist

Sample Template (K0000001817) provides a 'sample template' inspection checklist that can be used when performing an inspection. (see Section 7.0, Associated Documents/Links Table in the master Lockout/Tagout document in the Health & Safety Manual on the web)

6.0 TRAINING

For additional training information, refer to
NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

- A. All personnel who participate in the lockout/tagout program or who may be affected by this program shall be trained before they participate in the program, and annually thereafter.
 - 1. Each Authorized Employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
 - 2. Each Affected Employee shall be instructed in the purpose and use of the energy control procedure.
 - 3. All other personnel whose work operations are or may be in an area where energy control procedures may be used shall be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that is locked out or tagged out.
- B. Training should include a method to confirm that the purpose and function of the lockout/tagout program is understood and that the knowledge and skills required for the safe application, usage, and removal of energy controls are conveyed to all personnel who participate in the lockout/tagout program or who may be affected by this program.

- C. Training shall specifically address recognition of hazardous energy sources, type and magnitude of energy in the workplace, methods and means necessary for energy control, and the purpose and use of the lockout/tagout program. The training should also include rules and techniques to be used for applying lockout/tagout procedures and the means that will be used for enforcement of the program.
- D. Retraining shall be provided to all personnel who participate in the lockout/tagout program or who may be affected by this program whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard when there is a change in the energy control procedures or an inspection reveals inadequacies in the procedure.
- E. All training shall be documented, including the date and names of those persons attending the training.

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Lockout / Tagout document in the Health & Safety Manual on the web.



MANAGEMENT OF CHANGE (MoC)

MoC

MANAGEMENT OF CHANGE

PURPOSE / SCOPE

MoC is a system to confirm that changes are properly recognized, reviewed, approved, communicated and documented. Temporary and permanent changes which impact the Strategic Performance Unit's (SPU) operation or equipment and that, are not replacement in kind, will be evaluated and managed to confirm that health, safety, security, operational, and environmental risks arising from these changes remain at acceptable levels. A MoC system that complies with IM and gHSEr Element 7 is designed to confirm that:

- temporary and permanent changes to organization, staffing levels, procedures, equipment, products, materials and substances are evaluated,
- processes are in place to confirm the MoC procedure has been correctly applied, the proposed modification is safe to commission and/or strategies to manage organizational risks (transitional and long tem) are developed,
- authority for approving MoC decisions is clearly defined,
- documentation requirements including the scope, justification for change and updates to all engineering drawings and operating procedures are defined,
- potential consequences, required mitigation and any time limitations are communicated throughout the SPU to affected staff,
- a Pre-Startup Safety Review (PSSR) is completed after modification to confirm the change was made as designed with relevant details/training communicated,
- the proposed changes do not compromise approved emergency response plans,
- individual MoCs are not closed out until relevant documentation is updated and made available to staff, and

- annual or more frequent assurance by competent person to verify the SPU MoC system is being applied correctly.

For major modifications or additions to facilities where the Capital Value Process (CVP) for projects will be used, MoC will also apply. The operating facility will need to manage the modification/addition through the MoC practice. In addition, the project team may need to utilize the MoC practice after the design PHA has been completed to manage ongoing design changes.

The Environmental Management System (EMS) Document Control Procedure provides MoC for the various procedures and documents in the EMS. The EMS Document Control Procedure may also be used for other procedural revisions, as appropriate, except for those management systems, operating and maintenance procedures required as part of OSHA's Process Safety Management (PSM) program, EPA's Risk Management Plan or BP's Integrity Management (IM) program.

Those US properties covered by the OSHA 29 CFR 1910.119 regulation for PSM are required to have a site-specific procedure that details how MoC is accomplished for the location. Each location will need to confirm that their site MoC process is consistent with the NAG MoC Procedure.

All locations shall utilize the Electronic Management of Change Application (eMoC) to document, track, and audit the MoC process.

DEFINITIONS

Administrative Change: Temporary or permanent changes to a policy, procedure, process or form made at SPU, OC or plant level that affects process safety and integrity management.

Approver: Person responsible for approving a change to take place.

Authorizer: Person responsible for authorizing a change to be implemented (started up).

Coordinator: Responsible position or individual that is charged with coordinating the local MoC system and providing assurance to local management that they are meeting expectations. Coordination of eMoC, if used, may be part of the MoC Coordinator's responsibilities or assigned to another individual. The MoC Coordinator should be identified on the site organization chart.

Emergency Change: An action necessary to remedy an emergency that poses imminent danger to safety, health, the environment or has a serious financial impact, which demands an immediate response.

Formal Safety Assessment: The process of understanding hazards by hazard identification and analysis of the causes, consequences, potential for escalation, and preventions.

Initiator (Originator): Person involved with an asset who recognizes a change and initiates the MoC process.

Organizational/Personnel Change: A temporary or permanent change in the organization or in personnel with specific knowledge or experience who supervise or operate a facility which would lead to a loss of knowledge or experience.

Post-Implementation Action Item: Action which must be completed prior to an MoC for a change to be closed out.

Pre-Implementation Action Item: Action which must be completed prior to a change being implemented (started up).

Procedure Change: Deviation from approved work procedures or standard operating procedures.

Risk Assessment/Hazard Analysis: A broad term for formal and informal tools used to identify health, safety and environmental hazards and to develop controls to minimize, mitigate and/or eliminate them. Examples: RAT/JSA, Risk Matrix, What-if (brainstorming), What-if Checklist, HAZOP, Organizational Change Risk Assessment, Quantitative Risk Assessment, etc.

Replacement-in-Kind (RIK): Replacement-in-Kind (RIK) is the replacement of an item (e.g., equipment, chemical or procedure) with another item that meets the original design specification of the item being replaced.

Reviewer: Individual whose expertise and experience qualify them to be recognized as technically competent on issues such as process design, mechanical design, instrumentation/control, electrical, civil/structural design, rotating equipment, etc.

Technical Change: A temporary or permanent physical change to an existing facility or process or deviation from the documented design limits.

Temporary Change: A change not intended to be permanent and that will not exceed the indicated time frame for the change without additional review and approval. A time must be specified when the temporary change is to be returned to the original conditions and is subject to the same evaluation as a permanent change.

Verifier: Individual, usually the initiator's first line supervisor, who confirms feasibility of a proposed change.

GENERAL REQUIREMENTS

All personnel assigned to the Business Unit are responsible for managing changes that can occur within our field and Houston office operations. The individual who coordinates the change shall have the primary responsibility for confirming that the MoC process is completed. Each OC should have a designated point contact for MoC and be responsible for confirming that employees are adequately trained.

KEY RESPONSIBILITIES

All levels of Management are responsible for:

- Implementing the requirements of this standard,
- Identifying the competent persons and delegating to them the responsibility for detailed development of MoC proposals,
- Approving and Authorizing permanent and temporary changes, and

- Coordinating assurance assessments and minimizing duplication of effort.

All other Staff is responsible for:

- Understanding the need for MoC and the proper procedure,
- Following the MoC procedure,
- Initiating an MoC as appropriate, and
- Assuring MoCs are conducted as necessary.

MoC PROCESS

MoC Initiation

MoC Initiation may begin with any employee assigned to NAG. The MoC Initiator is responsible for:

- Discussing proposed change with Line Supervisor, other key personnel and actioning the "**INITIATE**" stage of the MoC process,
- Initiating an eMoC, selecting a Verifier(s) and providing information regarding a proposed change to the Verifier(s), to include such items as title, scope, justification, identification of the affected drawings, and comments or concerns associated with the change,
- Assisting the Verifier(s) in selecting the technical Reviewers, and
- Confirming that the MoC documentation is forwarded to the Verifier(s).

Note: It is encouraged (but not required) that discussions are generated with a verbal agreement obtained from key personnel, prior to actioning the "INITIATE" stage of the MoC process.

MoC Verification

MoC Verification is normally performed by the initiators line supervisor, facility engineer or an employee delegated by BP management.

The Verifier shall:

- Scrutinize the requested change to determine whether the change fits within the MoC applicability guidelines,
- Appoint the MoC Coordinator, and

- Confirm the selection of the Reviewers in consultation with the MoC Coordinator, Initiator and or Facility Engineer .

The VERIFY stage of the MoC practice is in alignment with the Capital Value Process (CVP) SELECT Stage.

MoC Coordination

Every MoC has one Coordinator assigned. The MoC Coordinator is the person assigned by the Verifier(s) to manage the MoC process from Review through Closure.

The MoC Coordinator shall:

- Assign personnel responsible to review, approve, complete required action items, and authorize a proposed change,
- Confirm that technical reviews have been completed,
- Confirm that relevant documentation is updated,
- Confirm than required Risk Assessments are conducted and recommendations are addressed,
- Resolves conflicts/concerns associated with the MoC,
- Consult with the Line Supervisor to confirm that assigned personnel are addressing their responsibilities in a timely and efficient manner,
- Identify and document Pre/Post Implementation action items,
- Confirm that the required PSSR is conducted,
- Confirm proper communication, documentation, and follow-up of each assigned MoC,
- Action the "**HOLD**" function during the process for changes which may be delayed, and
- Confirm that the MoC process is completed by actioning the "**CLOSED** or **CANCELLED**" function.

Note: 1. There SHALL be an assigned MoC Coordinator for every MoC.

MoC Review and Evaluation

The review cycle is an integral part of the MoC process and the level of detail for each review should be appropriate for the complexity of the proposed change and for the potential hazards the change poses. Reviews are in place to confirm all changes meet the following:

- Fulfillment of getting Health, Safety, and Environment right (gHSEr) expectations,
- Adherence to all applicable codes and industry standards,
- Adherence to Design specifications/generally accepted engineering practices,
- Compatibility with existing processes or equipment, and
- Consideration of the impact on future operations.

Reviewers must have a thorough understanding of the MoC practice and be knowledgeable, trained and experienced with the equipment, practices and process changes under consideration. Review team members are responsible for documenting the review if hazards or consequences associated with the change are identified. If no hazards are identified, the reviewer should annotate as such on the MoC form.

Technical Reviewer / Facility Engineer

This individual selected by the Initiator, Verifier and/or Coordinator to conduct a specific discipline review for an MoC. The level of review should be appropriate for the complexity of the proposed change and for the potential hazards the change poses. This includes evaluation of the proposed change as described in the MoC and making the appropriate recommendations which shall be documented. The primary focus of the discipline Reviewer(s) is in their area of expertise, but should highlight any other issue that may be identified. The Technical Reviewer shall:

- Document comments and recommend other personnel as additional discipline Reviewers,

- Identify hazards that the proposed change can create,
- Fulfill gHSEr expectations,
- Confirm adherence to applicable codes and industry standards,
- If necessary request that a team conduct a more extensive hazard evaluation (formal PHA or risk assessment),
- Determine if the change can be easily implemented. (This should include consideration of both Process Safety and HSSE concerns including industrial/personal hygiene and PPE),
- Determine whether the appropriate controls are identified. (Special permits, additional staffing, specific supervision during implementation),
- Determine what additional activities should be accomplished prior to the implementation of the change. (Developing operating procedures, training of personnel, communicating the change, purchasing special materials, if a PSSR is required),
- Identify and confirm conformance with applicable Codes and Standards,
- Confirm compatibility with existing processes or equipment,
- Consider the impact on future operations,
- Select the appropriate Technical Authority (TA) for changes requiring clarification of existing codes and standards or a higher level of functional expertise, and
- Selects the appropriate Engineering Authority (EA) for changes outside the confines of accepted industry codes and standards, approved internal company standards and/or regulatory requirements.

Note: Every MoC shall be reviewed, and all Reviewers shall agree before proceeding to the APPROVE stage. Disapproval of an MoC shall be justified in writing.

Technical Authority (TA)

The IM Standard defines TA, as persons with specific discipline expertise appointed by the EA. The primary role of TAs is to act as the Technical Integrity Advisor within their designated engineering discipline or activity by confirming the safe and consistent application of company and regulatory codes and standards and good engineering practices. General areas of responsibility for TAs are:

- Technical Risk and Integrity Management,
- Application of Engineering Technical Practices,
- Application and upkeep of Site Technical Practices,
- Identification of risk and mitigation recommendations,
- Technical MoC Reviewer,
- Review of technical modification or change beyond company technical practices or industry standards,
- Technical reviews of non-major projects in Capital Value Process (CVP) Select and Define stages, and
- To provide technical assistance to engineering staff.

Engineering Authority (EA)

The EA is accountable for confirming processes and systems are in place for the identification and management of engineering risk. The EA shall also review and approve all changes which do not fall within company or industry standards. The EA shall also be responsible for the controlled application of Site Technical Practices (STPs) appropriate to the BP Operation (SPU, OC or Project). The Engineering Authority is responsible for the annual audit of the MoC System.

Rejection by the evaluation team will be documented and the Coordinator will include/attach the rejection rationale with the MoC documentation to file for future reference. All affected personnel will be advised of the rejection rationale.

MoC Approval

All MoCs shall be approved prior to the requested change going forward. The Approver shall have the appropriate level of approval authority, as prescribed in the NAG MoC Delegation of Authority (DOA) document, for the MoC involved and is responsible for:

- Confirming that all appropriate Reviewers have reviewed and recommended the change,
- Confirming that all relevant personnel have indicated agreement of the change by either electronic or hardcopy signature,
- Confirming that required documentation is available and is up to date,
- Confirming that the proposed changes shall accomplish their original intent,
- Recommending additional Reviewers,
- Requesting additional information, and
- Actioning the "**APPROVE**" stage of the MoC practice.

The APPROVAL stage of the MoC practice is in alignment with the Capital Value Process (CVP) EXECUTE Stage.

Note: APPROVAL of an MoC gives permission to begin pre-implementation action items related to the change. Disapproval of an MoC SHALL be justified in writing.

Pre-Implementation Action Item Assignment and Completion

Most MoCs will have some form of pre-implementation action items associated with them. The number of these actions can vary greatly based on the risk, complexity and magnitude of the change. The appropriate pre-implementation action items shall be chosen for completion along with a person responsible for completing each assigned action item. Pre-implementation action items may include, but are not limited to:

- Updating Process Safety Information as required,
- Redlining facility drawings (PFD, P&ID, area classification, etc),

- Redlining operating procedures,
- Redlining maintenance procedures and equipment data files,
- Redlining Emergency Response Plan,
- Updating applicable regulatory requirements (fugitive emissions inventories, emission factors, new regulatory reporting, etc),
- Confirm that training has been completed and documented, and
- Confirm that the PSSR has been completed and documented.

Training Completed

The individual assigned the responsibility of providing training (face to face, email notification, etc) and/or confirming that affected personnel have been trained shall sign off on the "training completed" pre-implementation action item if this action is required.

Training should include the following:

- The change and its effects on the process,
- Updates or changes to the Incident Emergency Plan (IMP),
- PHA recommendations and/or resolutions,
- Changes to regulatory compliance obligations,
- Changes to job duties or work tasks, and
- Changes to startup, operations and maintenance procedures,

Training should fit the complexity of the change, be documented and provide assurance of understanding, as needed. Email notification in lieu of formal training for minor, lower risk changes should provide an audit trail of who was notified and when.

PSSR Completed

The Integrity Management Standard requires a PSSR be completed for every technical change. For OSHA PSM covered properties, a PSSR is legally required if the Process Safety Information will be affected by the change. The individual

assigned the responsibility of conducting the PSSR shall sign off on the PSSR complete pre-implementation action item upon completion. The PSSR must be documented with supporting data and attach to the MoC prior to MoC closeout.

MoC Authorization to be Implemented (Started-up)

Prior to employees implementing a change in the office or field, that change must be authorized. The Authorizer shall have the appropriate level of authority, as prescribed in the NAG MoC DOA document, for the MoC involved and is responsible for:

- Confirming conformance to the MoC practice and compliance with regulatory agencies, company and industry standards,
- Confirming that assigned pre-implementation actions were appropriate/completed for the change and that post-implementation actions are identified and assigned,
- Confirming that the change accomplishes its original intent, and
- Sanctioning the change by actioning the "IMPLEMENT" stage of the MoC practice.

The AUTHORIZATION stage of the MoC practice is in alignment with the Capital Value Process (CVP) OPERATE Stage.

Post-Implementation Action Item Assignment and Completion

The appropriate post-implementation action items shall be chosen for completion along with a person responsible for completing each. Prior to close-out of an MoC these post-implementation action items must be completed. It is the Coordinator's or designated persons responsibility to confirm all required actions have been completed prior to MoC close-out. The number of these actions may vary greatly based on the risk, complexity and magnitude of the change. Post-implementation action items may include but are not limited to:

- As-building facility drawings (PFD, P&ID, area classification, etc),
- As-building of operating and or maintenance procedures,
- As-building of Emergency Response Plan,
- Updating MAXIMO/Work Management System (WMS), and
- Distribution of documents which have been updated to the designated individuals.

MoC Close-Out

The MoC Coordinator or designated person(s) will be responsible for closing out the specific MoC to which they were assigned upon project completion by:

- Confirming the change was performed as intended,
- Confirming that required/relevant MoC specific documentation has been filed, and
- Closing out the MoC in a timely manner. There is a 90-day window after implementation of the change in which an MoC must be closed out.

Emergency Changes

In Emergency Situations, it is understood that completion of the MoC practice usually cannot be applied until after the change has been implemented. The MoC practice shall be completed after the fact to confirm that the change(s) have been made and that there are no additional actions necessary to secure the long-term acceptability of the change. The asset has 96 hours to complete a formal MoC having it progressed though the Authorized stage (MoC Status = Implement).

Emergency changes require coordination between local management and facility engineering. Local management shall approve the change based on facility engineering's hazard analysis.

Temporary MoCs

Temporary MoC's will be of relatively short duration, from a few days to several weeks. A few MoCs for various reasons will be required to be open for an extended period of time. When the time period expires, the change shall either become permanent or changed back to its original state. For a change to become permanent, the change must be resubmitted through the MoC system as a permanent MoC. The maximum time frame for a temporary change to be in effect is no longer than 90 days after the change was approved. When the approved timeframe has been reached the MoC will EXPIRE. When a temporary MoC expires, and the temporary changes must remain in place, the asset has 96 hours to complete a new MoC through the Authorized stage (MoC Status = Implement).

MoC TRAINING

MoC Training will be required for every employee on a 2 year cycle and for all new hires. For additional training information contact the NAG MoC Specialist.

DOCUMENT RETENTION

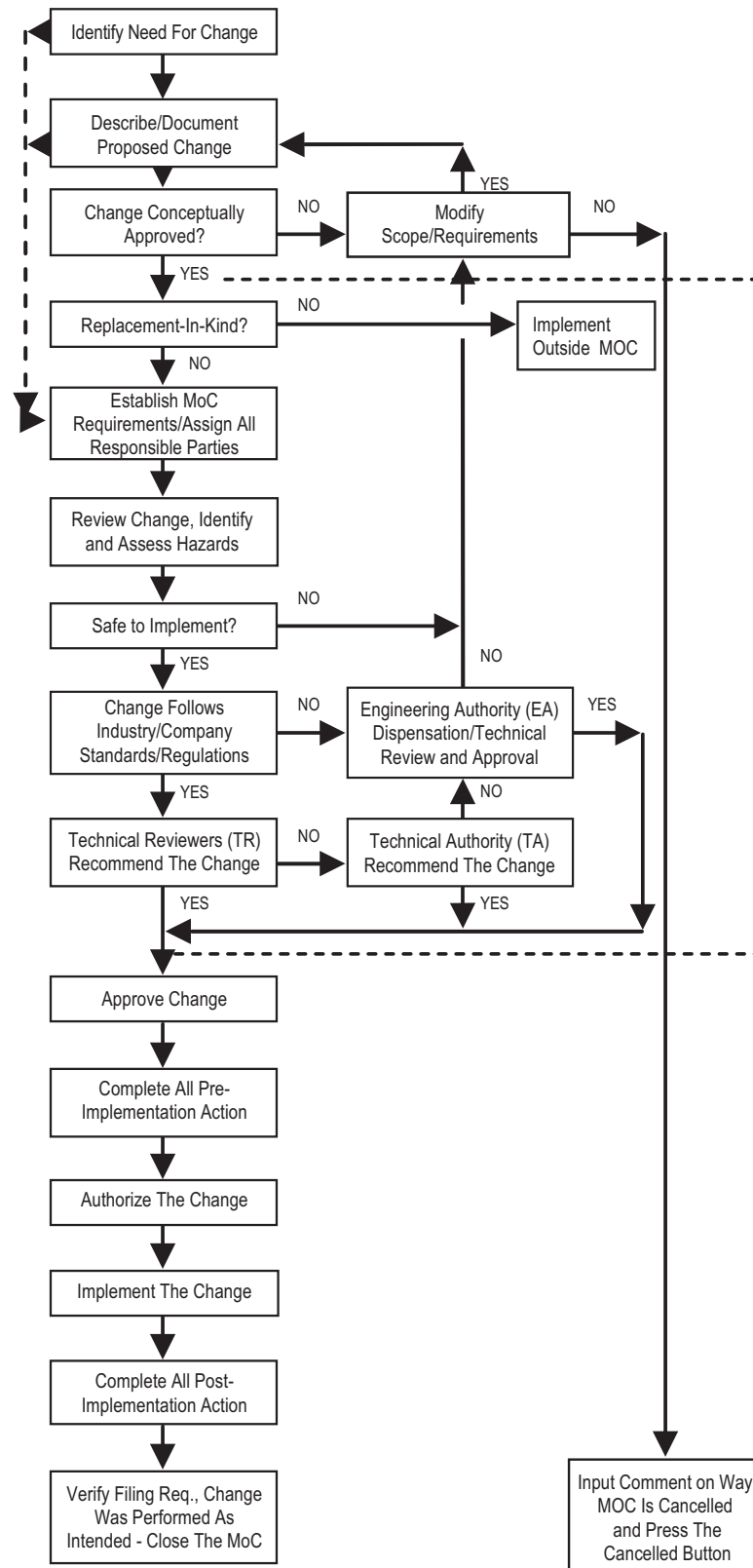
MoC documentation will be maintained for the life of the facility.

CANCELLED MoCs

If the MoC is rejected for any reason, that MoC is considered cancelled. Before the MoC is cancelled in the system, the person canceling the MoC is responsible for confirming that a reason for the cancellation is documented on the MoC form and notifying the MoC Coordinator. The MoC Coordinator then cancels the MoC.

* Cancelled MoCs remain in the system and may be viewed at any time.

BASIC MoC WORKFLOW





**NATURALLY OCCURRING
RADIOACTIVE MATERIAL
(NORM)**

NORM

NATURALLY OCCURRING RADIOACTIVE MATERIAL (NORM)

WHERE IT IS FOUND

NORM scale can be produced where naturally occurring radium and thorium in formation shale are dissolved into the water. During drilling, NORM may be deposited as solids or sludges that form inside down-hole equipment (e.g. tubing, landing nipples and subsurface safety valves) and on the inner surfaces of meters, separators, chokes, drains, and oil/produced water tanks. During production of gas and water, these materials can be transported to the surface where they may be found as scale inside heater treaters, separators, tubing, flow lines, pumps, filters, and, on rare occasions, inside short sections of process pipe downstream from elbows or transitions. NORM is most commonly found where there is a pressure drop or a change in velocity or direction of flow.

HEALTH EFFECTS

NORM is an internal exposure hazard and may cause biological damage.

Exposure occurs when dust is inhaled and when NORM is ingested via NORM-contaminated hands, food, water, cigarettes, and clothing.

Health effects at elevated exposures may include blood changes, radiation sickness, reproduction effects and lung cancer.

EXPOSURE LIMITS AND CONTROLS

- For any equipment where survey readings indicate that the NORM is over **50 $\mu\text{R/hr}$** the additional NORM Procedures outlined in Section 4.3, Specific NORM Work Procedures of the BP NAG and GoM NORM Manual must be implemented and alpha/beta particle (types of NORM radiation) sampling should be conducted to determine risk of employee respiratory exposure from loose surface contamination.

- For any equipment where survey readings indicate that the NORM is over **2,000 $\mu\text{R/hr}$** , only a licensed NORM contractor will be allowed to perform work with the equipment or materials.

The following radiological precautions should be followed when working with or around NORM containing pipe, equipment, soil, or wastes:

- Avoid direct skin contact with radioactive scale, solids and liquids.
- Do not eat, drink, smoke or chew in the work area.
- Decontaminate clothing, boots and skin after working with NORM-containing equipment and before eating, drinking, or smoking, and at the end of the workday.
- NORM-containing materials should be kept wet to limit the possibility of NORM becoming airborne.
- Field measurements shall be taken by trained personnel using calibrated NORM surveying equipment, (e.g. a Ludlum Model 19 or gamma RAE pager.)

PROCEDURE / PROCESS

At a minimum, BP employees must follow these procedures:

- Survey all stationary and recovered equipment (i.e., tubulars, valves, vessels) that could contain NORM prior to disposal, sale or transport of equipment.
- Identify/label NORM-containing equipment.
- All personnel who work with, or may work with, NORM must be properly trained.
- Survey any vessel or confined space that could contain potentially NORM before entering. A Confined Space Entry Form must be issued in all cases. Maintain documentation of the monitoring results in the facility HSE files. Notify all personnel involved in the operation of the results of the monitoring.

- Test all well solids for NORM.

Note: Contact your Environmental Coordinator for additional information on waste disposal of NORM-containing materials.

- Wear proper personal protective equipment when entering NORM-containing vessels or when handling equipment or materials with exposed NORM.
- Thoroughly wash hands and face immediately following any skin contact with NORM, especially prior to eating, drinking or smoking.
- Minimize the number of personnel conducting NORM work.

PERSONAL PROTECTIVE EQUIPMENT

The degree of PPE required will depend upon the work being conducted (e.g., if there is a potential for high particulate levels, or a sufficient level of loose surface contamination is present, respirators with cartridges should be worn; if there is a potential a large amount of wet NORM contaminated materials, full rain suits are recommended). In general, workers performing work with NORM containing equipment or materials should never wear less than a long-sleeved shirt, disposable or non-porous gloves and safety glasses with side-shields (goggles are preferred).



PERSONAL PROTECTIVE EQUIPMENT (PPE)

PERSONAL PROTECTIVE EQUIPMENT (PPE) (K0000000447)

1.0 PURPOSE / SCOPE

Personal Protective Equipment (PPE) is intended to shield or isolate personnel from chemical and physical hazards. This document outlines PPE requirements for personnel within the North America Gas (NAG) Onshore US Operations.

2.0 DEFINITIONS

Fire Retardant Clothing (FRC): Clothing that mitigates the potential of injury to an individual in the event of a flash fire.

Hazard Assessment: A defined process used to determine existing or potential hazards while performing specific jobs/tasks in the workplace.

Jewelry: Accessories or adornments worn by a person (e.g., cellular phone lanyards, finger rings, wrist watches, bracelets, neck chains, ear rings and/or any body piercing).

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s) identified. The JSEA shall be discussed with all personnel involved before work begins.

Personal Protective Equipment (PPE): Clothing and equipment designed to be used on the body to create a protective barrier against absorption, inhalation, or physical contact with chemical or mechanical hazards. PPE is to be worn to meet both BP and regulatory requirements for the jobs/task being performed.

Task: An activity in support of a piece of work.

3.0 GENERAL REQUIREMENTS

3.1 Hazard Assessment

A hazard assessment of the workplace shall be performed prior to commencement of work to determine if hazards are or may be present that necessitate the use of PPE. Refer to OSHA 29 CFR 1910.132 Subpart I to determine the proper method of conducting an assessment.

The Person in Charge (PIC) shall verify that the required workplace hazard assessment has been performed, either through a:

- Job Safety and Environmental Analysis (JSEA),
- Procedure, or
- Written site hazard assessment.

The written certification shall include:

- The workplace evaluated;
- The person certifying that the evaluation has been performed; and
- The date(s) of the hazard assessment.
- A statement that identifies the document as a certification of hazard assessment

3.2 INSPECTION AND USE

To confirm that PPE is appropriate for the task being performed and is in good condition, it shall be inspected prior to each use as per manufacture's recommendations and properly sized to fit the worker. In the event that equipment is damaged, it will be either properly disposed of, sent in to be repaired, or replaced. **Refer to the local Operating Center's procedure for care and handling of damaged equipment.**

4.0 KEY RESPONSIBILITIES

Operating Center Managers (OCMs) and local Wells Field Superintendents are responsible for implementing and enforcing the requirements in this document.

5.0 PROCESS

Specific requirements for appropriate PPE selection and use are contained in this section.

5.1 Regular Clothing

- Jewelry, rings, wrist watches, loose clothing, unsecured long hair and loose accessories shall not be allowed within arm's reach of machinery, tools, electrical switch gear or locations where the loose items present a hazard.
- Personnel at the work site shall wear a sleeved shirt (covering half of the upper arm) and full length trousers while in operational areas; the preferred cloth is cotton or wool. Synthetic clothing will melt and severely burn the skin when exposed to heat such as a flash fire.
- Flame Retardant Clothing (FRC) as addressed in Section 5.2 below is required when performing certain jobs/tasks as identified in each Operating Center's and Well Operation's Site Hazard Assessment.

5.2 Fire Retardant Clothing (FRC)

5.2.1 FRCs shall be worn in accordance with the Site Hazard Assessment but, at a minimum, full body FRC's shall be required when personnel are:

- Located within 35' of any hydrocarbon-containing field or plant equipment (e.g. piping, vessels, tanks, and wells);
- Involved in well servicing, well testing or under balanced operations during drilling or completion operations;
- Exposed to potentially live electrical circuits; or
- When site-specific job/task and/or area with potential exposure to flash burn injuries are identified.

5.2.2 FRC is not required in the situations as described below, unless specified otherwise in local policies:

- While fueling vehicles;
- While located inside a vehicle, including areas within 35' of any hydrocarbon-containing equipment;
- In the area of buried hydrocarbon containing facilities (e.g. piping), unless those facilities are in the process of being exposed; or
- While in administration or shop buildings.

5.2.3 FRC shall be worn and maintained as follows:

- Personnel shall wear FRC as the outer most garments except when other is required (e.g. chemical resistant suits, welder's leather garments, personal flotation devices). It is recommended that FRC be used for external protective garments such as slicker suits.
- Personnel should not wear synthetic blends such as nylon, polyester, rayon, or polyethylene under FRCs. Natural fibers such as cottons and wools are recommended when layers are worn under FRCs.
- Only long-sleeved FRC may be worn in designated FRC areas/jobs.
- FRCs shall be worn in such a manner as to completely cover the torso, arms, and legs (sleeves rolled down and body fully zipped or buttoned up).

FRCs shall be laundered, repaired, and taken out of service as per the manufacturer's recommendations (see NAG SPU Fire Retardant Clothing Laundering and Care).

- In situations where FRCs become saturated with flammable liquid or chemicals, the personnel exposed shall withdraw to a safe area, remove saturated clothing, wash contaminated skin, and change into clean clothes prior to commencing work.

5.2.4 FRC garments shall comply with the requirements below:

- Thermal protection: If the protective garment is worn over another layer of fabric, the protective fabric shall exhibit an average Thermal Protective Performance (TPP) value of 4 (before and after washing). If the protective garment is to be worn next to the skin, without another layer underneath, the protective fabric shall exhibit an average TPP value of at least 6.
- Fabric Weight: FRC material shall not be less than 4.4 oz/yd² (150 gram/m²).
- FRC materials shall comply with NFPA 2112 and be tested to ASTM F 1930.
- BP personnel shall be required to wear Fire Resistant Clothing (FRC) made from inherently fire resistant material (e.g., Nomex).
- Optional reflective stripes shall conform to the ANSI/ISEA 107-1999 Level 2.

5.3 Head Protection

- Hard hats meeting ANSI Z89.1 standards (see OSHA CFR 1910.135 Head Protection) are mandatory, except as designated in the local Hazard Assessment. Type I Class E & G hard hats are recommended; however, the local Operating Center's Personal Protective Equipment (PPE) Hazard Assessment shall specify the Type and Class to be used.
- Hard hats shall be inspected per manufacturer's recommendation prior to each use. If a hard hat becomes brittle, cracked, or is otherwise damaged, it shall be replaced immediately.
- Suspensions and shells shall be replaced per manufacturer's recommendation. For example: MSA recommends that suspensions be replaced at least annually and that shells be replaced at least every 5 years.

5.4 Eye Protection

- Approved safety glasses with side shields or goggles meeting ANSI Z87.1 standards are mandatory in all operation areas except as designated in the local Operating Center's Hazard Assessment (see OSHA CFR 1910.133 Eye and Face Protection).
- Prescription safety glasses shall be purchased for BP employees when a BP employee wears corrective lenses and performs tasks where eye protection is required. Contact lenses may be permitted but require the additional use of eye protection.
- Operations which require additional eye protection will be assessed on an individual basis. Chemical handling, pressure washing and jet washing may require the use of specific safety glasses or goggles per the MSDS.

5.5 Face Protection

During all operations involving grinding, chipping, and buffing, or where material could separate and become a projectile, a face shield shall be worn in conjunction with safety glasses/goggles per the local Hazard Assessment. Chemical handling may require the use of specific face shields per the MSDS (see OSHA CFR 1910.133 Eyes and Face Protection).

5.6 Hearing Protection

The Hazard Assessment shall identify areas where hearing protection is necessary and the level or degree of protection required. Signs shall be posted at each location where continuous noise levels are at 85 dBA or greater. Various forms of hearing protection are available. Hearing protection must be worn in posted areas. Hearing protection must also be worn during operations that generate noise in excess of 85 dBA, such as blowing down lines or certain workover or drilling activities (see OSHA CFR 1910.95 Noise Exposures).

5.7 Hand Protection

Hand protection shall be selected based upon each local Operating Center's PPE Hazard Assessment and shall meet the requirements of OSHA CFR 1910.138 Hand Protection.

5.8 Foot Protection

Foot protection shall be selected based upon each local Operating Center's PPE Hazard Assessment and shall meet the requirements of American Society for Testing Material (ASTM) International Standards F2413-05 and OSHA CFR 1910.136 Foot Protection. (Note: ANSI Z41 was withdrawn on March 1, 2005 and replaced with ASTM F2413-05 Standard Specification for Performance Requirements for Foot Protection.)

6.0 TRAINING

Refer to NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master PPE document in the Health & Safety Manual on the web.



**PURGING AIR FROM PIPING
AND VESSELS IN
HYDROCARBON SERVICE**

PURGING AIR FROM PIPING AND VESSELS IN HYDROCARBON SERVICE (K0000000466)

1.0 PURPOSE / SCOPE

This document is intended to provide guidance as to the necessary elements and options for purging air from piping and vessels in hydrocarbon service. This procedure is a guideline and it does not substitute for local procedures or local engineering review of those procedures.

2.0 DEFINITIONS

Auto-Ignition Temperature: The temperature that will cause an explosive mixture to spontaneously ignite. As pressure or temperature increases, the auto-ignition temperature will decrease.

Clearing/High Velocity Purge: Replacement of one substance so rapidly that there is a minimum of mixing, thus reducing the duration of any explosive mixture.

Critical Flow: Whenever pressure downstream of a choke is less than the critical pressure, the flow rate of a gas through the choke will be a constant that is dependent upon the upstream pressure and the speed of sound.

Critical Pressure: The pressure downstream of a choke at which flow changes from critical to sub-critical with increasing downstream pressure. The critical pressure is:

$$P_{cf} = P_f \left(\frac{2}{k+1} \right)^{\left(\frac{k}{k-1} \right)}$$

Where both pressures are in absolute units and k is the ratio of specific heat at constant pressure to the specific heat at constant volume (k has a value of about 1.3 for methane at 100 psig and 60° F). Generally, critical pressure will be about ½ of upstream pressure.

Dilution Purge: Introduction of enough inert gas to confirm that an explosive mixture will not form.

Displacement Purge: Replacement of one substance with another without appreciable mixing. Displacement purges are typically done by separating the two substances with an inert fluid or with a mechanical pig.

Job Safety Environmental Analysis (JSEA): A JSEA is a communication and planning tool used to analyze a job in a methodical way by defining the key tasks of the job in order to anticipate hazards and recommend elimination or mitigation of the hazard(s). The JSEA shall be discussed with all personnel involved before Purging Operation begins.

Lower Explosive Limit (LEL): The lowest concentration of an explosive gas in air that will support combustion. Methane has a LEL of 5% at atmospheric pressure and 60° F. As pressure or temperature increases, the LEL will decrease.

Note: Combustible-gas detectors are calibrated as a percent of LEL, so when the detector registers 100% the concentration is at the LEL for atmospheric pressure and 60° F (or 5% methane by volume).

Pressurization Purge: Dilution of one gas with another by cycling pressure at least four times up to 15 psig and back to 0 psig. Typically this method is used to remove air from a system using 100% natural gas.

Upper Explosive Limit (UEL): The highest concentration of an explosive gas in air that will support combustion. Methane has a UEL of 15% at atmospheric pressure and 60° F. As pressure or temperature increases, the UEL will increase.

3.0 GENERAL REQUIREMENTS

3.1 The goal of purging lines and vessels is to:

- Confirm that an explosive mixture will not form, and
- Confirm that no mixture will be exposed to an ignition source.

3.2 By rigorously striving for both parts of the goal we will significantly reduce the risk of personal injury from the failure to meet just one of the goals (i.e., if an explosive mixture does form, keeping that mixture away from any possible ignition source will still prevent personal injury or property damage).

3.3 This document is intended to provide guidance as to the necessary elements and options for local purge procedures and it does not substitute for local procedures or local engineering review of those procedures.

4.0 KEY RESPONSIBILITIES

There are several groups and individuals that can be affected during purging operations. These will vary according to location and the scope of the purge being conducted. Some key responsibilities are:

4.1 Local Management

Local management shall confirm that their employees follow the guidelines set forth in this procedure.

4.2 Operations

Operations shall confirm that proper individuals and agencies have been notified of impending purging operations. In order to comply with the company's Environmental Management System (EMS) procedure, the local Field Environmental Coordinator (FEC) will need to be involved.

4.3 Construction and Maintenance

Construction and Maintenance will need to communicate with Operations when performing work on piping and vessels in the area. This will help confirm that the desired purge is completed.

5.0 PROCEDURE

5.1 Ignition Sources

Since one of the goals of a purge process is to prevent a mixture of gases from contacting an ignition source, any purge procedure must identify possible ignition sources.

Normal Sources: These ignition sources include unclassified electrical equipment, engine exhaust, welding equipment, etc.

Static Electricity: Whenever a mass moves relative to another mass (e.g., stocking feet on a carpet, or gas flow through a pipe) there is a possibility of one of the masses accumulating a static charge. This charge can become significant when long runs of piping are included. If there is a path to allow a built-up charge to pass to ground by arcing, then the arc can be hot enough to ignite an explosive mixture. Caution: Static electricity can be a severe problem, when there is a combination of nonconductive containers (i.e. fiberglass, poly, etc.) and low conductivity fluids (i.e. condensate, oil, plastic pellets, etc).

Heat of Compression: A high-velocity gas stream will not readily mix with a static fluid volume within a pipe or vessel. The high-velocity stream will try to compress the static volume against a closed valve or other dead end. This compression will continue until the downstream volume is at a high enough pressure that further flow of the high-velocity stream is impossible. While compressing the static volume its temperature can rise above the auto-ignition temperature of an explosive mixture.

5.2 Purging Guidelines

5.2.1 Clearing / High Velocity Purge

Using produced gas to purge air from piping and vessels is the most common purging activity undertaken in our business. This can be done safely if the procedure takes into account all of the prerequisites and design considerations below.

5.2.1.1 Prerequisites

Evaluate System Volumes: Clearing purges are most effective for a single straight path from the source to the vent. As a rule of thumb, the sum of the volume of all branches and deadlegs shall be less than about 10% the main volume being purged.

Source Gas: Confirm that the source of gas is free of oxygen.

Automated Valves: Confirm that any automated valve in contact with the purge flow (e.g., the dump valve on a separator that is being purged) can be disabled in the position that the purge requires (e.g., remove control pressure from a fail-closed valve that you want to purge against or block open a fail-closed valve that you want to purge through).

Purge Monitoring: Confirm that is a pressure gauge downstream of the valve controlling the purge to confirm that required pressures are maintained.

5.2.1.2 Design Considerations

Vents: The placement and size of the flow outlet is critical to a safe purge procedure.

- **Number of vents-one:** Having multiple vents open creates the potential for the entire purge stream to flow out of the first vent and for the subsequent vents to ingest air, thus increasing the risk of an explosion or fire.
- **Vent location:** The single vent shall be located as close to the dead-end point as possible to minimize the quantity of trapped air in the deadleg between the vent and the last block valve.
- **Vent size:** The size of the vent determines the largest pipe or vessel diameter that you can purge at a given pressure. At a purge pressure of 15 psig, a 36-inch vessel can be purged through a 1-inch valve and a 72-inch vessel through a 2-inch valve. At 200 psig purge pressure the largest line that can be purged through a 1-inch valve is 4 inches, and a 2-inch valve can be used to purge a 24-inch vessel.

Purge Pressure: The purge rate is based on the pressure within the piping. To allow an adequate purge in a volume of pipework, the purge pressure must be high enough so that critical flow is reached. When venting to atmosphere, any pressure above approximately 15 psig will confirm critical flow. Using purge pressures substantially above 15 psig will require increased purge time and will result in venting excessive quantities of gas to the atmosphere with no improvement in purge efficiency.

Purge Rate: The introduction of purge gas shall be done at a rate consistent with the flow out the vent so that a constant pressure is maintained in the line. This can be controlled by throttling the source valve open in very small increments to raise the pressure.

Once the purge has started it must continue to completion. Stopping or significantly slowing a purge in progress will result in rapid mixing of the purge gas with the air in the line and can create an explosive mixture.

If the purge must be interrupted, then the line shall be blown back down to zero and the purge restarted from step one. If the source valve is open too far and the pressure in the line increases, increase the duration of the purge. Add 10% of the remaining time for each 15 psig above the purge-design pressure (e.g., if you are 10 minutes into a 15-minute purge and the pressure has crept to 30 psig, then the remaining time shall be adjusted to 5.5 minutes).

Records of the purge pressure, the time required, and the volume purged shall be maintained to satisfy reporting requirements for green-house gas emissions.

Purge Time: Through extensive experimentation, it has been determined that purging 2.5 pipe volumes will provide almost 100% probability that the entire original atmosphere of the pipeworks has been replaced with purge gas. As a practical consideration, it is generally better to round the required purge volume to 3 pipe volumes.

As long as the exhaust pressure is at or below the critical pressure, purge time can be calculated by:

$$t = 3 \left(\frac{\sum ID_{seg}^2 L_{seg}}{ID_{vent}^2 v} \right) \left(\frac{P_f T_S Z_S}{P_S T_f Z_f} \right)$$

In most cases, temperature and compressibility at flowing conditions are close enough to temperature and compressibility at standard conditions to drop those terms from the calculation. The vent inside-diameter is the ID of the reduced cross-section in the ball of a reduced-port ball valve, not the ID of the vent piping.

Converting the times from the calculation to minutes yields the following table:

Pipe Size	Vol/1000 (ft ³)	Purge Time (1-inch) per 1,000 ft at 15 psig (minutes)	Purge Time (2-inch) per 1,000 ft at 15 psig (minutes)
2	21.8	0.40	0.10
4	87.3	1.62	0.40
6	196.3	3.64	0.91
8	349.1	6.47	1.62
10	545.4	10.11	2.53
12	785.4	14.56	3.64
16	1,396.3	25.89	6.47
20	2,181.7	40.46	10.11
24	3,141.6	58.26	14.56
30	4,908.7	91.03	22.76

It is unacceptable to rely on explosive-gas detectors to determine when a purge is complete. The fluid dynamics of a critical-flow clearing purge are such that it is normal for the purge gas to bypass considerable volumes of air during the initial phase of the purge. Consequently, 100% LEL at the vent can often be seen long before a 3 pipe volumes purge is completed, and a gas detector would indicate the purge be stopped before the air has been removed. Further, a stream at 100% LEL may still be below the UEL and be explosive when a purge is based on a gas detector.

5.2.2 Dilution Purge

In a closed, air-filled system at atmospheric pressure, adding enough nitrogen to fill 49% of the pipe volume will confirm that an explosive mixture will not form (with a 20% safety factor). Because of the physical relationship between pressure, volume, and temperature, it is easy to determine when you have injected 49% of the pipe volume—the pressure (in psia) will increase by 49%. For example, if your atmospheric pressure is 12 psia, you can introduce nitrogen to raise the pressure in the line to 18 psia (6 psig) and you will have injected 50% of the pipe volume with the inert gas. Other inert gases can be used, but each has a different dilution rate (e.g., CO₂ will provide proper dilution at 38%).

Dilution purges are effective when the system configuration has large pipe volumes that would not be swept by a clearing purge (for example, a gathering system with three trunk lines coming together that would require two vents to be open during the purge).

Since injection rates, equilibrium temperature, and product removal are specific to a given piping configuration, dilution-purge procedures shall be developed by engineering personnel each time a dilution purge is considered.

5.2.3 Displacement Purge

If the air can be physically separated in the system from the explosive gas being introduced, the potential for explosion can be reduced to near zero. The difficulty with this is in confirming that the two gases have been completely separated and that none has leaked past the separating media. A slug of inert gas, a slug of liquid, or pigs can be used to isolate the gases. With inert gas or liquid very high gas velocity is relied upon to minimize mixing, and the high velocities bring with them the possibility of the explosive gas bypassing the slug and compressing the air to auto-ignition temperatures. A large static charge is generated from a pig moving through the piping, and any bypassed explosive gas could be ignited. Displacement purges are seldom the best choice.

5.2.4 Pressurization Purging (Blowdown)

Introduce a purge gas to increase system pressure to 15 psig, followed by depressurization to the atmosphere. If starting with an air filled system, then the purge gas source is to be from a known 100% natural gas system, such as from a production well or pipeline. A minimum of four pressure-depressure cycles at 15 psig shall be required to purge a vessel at atmospheric pressure. The pressurization purge is the preferred method for geometry piping such as dead leg branches, compressor packages and vessels/piping systems. Important: Do not exceed 15 psi during the entire purge procedure, to prevent excessive pressure build-up in event of accidental ignition. If a system filled with a combustible liquid needs to be emptied and then purged, then a 100% natural gas source may be applied to the vapor space at a pressure consistent with equipment design limitations. This procedure empties the vessel and purges the vapor space in the same process.

5.3 CONCLUSIONS

- Always assume that an ignition source is present and develop procedures to address possible ignition sources.
- The key to a safe purge is control. Manual valves shall be exercised to confirm that they are not frozen. Automated valves shall be disabled and/or blocked in a known position.
- The source of purge gas shall be verified to be oxygen free. Only a single vent valve should be open during depressure purge and to prevent re-introduction of air, this vent valve shall be closed as soon as pressure reaches zero.
- Standard clearing-purge procedures should be developed for frequent operations (e.g., purging a meter run, or purging a well site). Infrequent tasks, dilution purges, or displacement purges shall be designed for each specific job, and engineering participation in the development of those procedures shall be encouraged.
- The purging procedure shall specify opening one vent. For Clearing Purge, the vent shall be at least 1-inch nominal, and it shall be located as near the end of the purged piping as possible. Under no circumstances shall more than one vent valve be open during a purge.
- Pressure on the line being purged with a clearing purge shall be kept as low as possible while still high enough to provide critical flow out the vent.
- Once a clearing purge has started, do not stop (or significantly slow) the introduction of gas until the purge is complete. If pressure on the line increases during the purge time, increase the remaining purge time 10% for each 15 psig increase in pressure.
- When returning equipment to service after purging, pressure staging should be done gradually, in 100 psi increments until 200 psi is reached. Thereafter, staging may be done in 250 psi increments until working pressure is reached.

5.4 NOMENCLATURE

P_{cf}	Critical flow pressure (psia)
P_f	Upstream flowing pressure (psia)
k	Ratio of specific heats (c_p/c_v)
t	purge time (seconds)
ID_{seg}	Inside diameter of piping in a segment (inches)
L_{seg}	Length of a constant-ID segment (feet)
ID_{vent}	Inside diameter of vent valve (inches)
v	Gas velocity (critical velocity of methane is 1,315 ft/sec)
P_S	Standard pressure (14.73 psia)
T_S	Standard temperature (60° F or 520R)
T_f	Flowing temperature (R)
Z_s	Gas compressibility at standard temperature and pressure
Z_f	Gas compressibility at flowing conditions

6.0 TRAINING

Refer to NAG SPU Training Website
(<http://hsetrain.bpweb.bp.com>)

7.0 KEY DOCUMENT / TOOLS / REFERENCES

Refer to the master Purging Air from Piping and Vessels in Hydrocarbon Services document in the Health & Safety Manual on the web.



RESPIRATORY PROTECTION

Respiratory Protection

RESPIRATORY PROTECTION PROGRAM

This program addresses the use of air purifying and supplied air respirators and provides procedures in the selection, use, and care of respiratory protection equipment. The program's primary objective is to prevent personnel exposures. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection shall be used.

When jobs are identified for which respiratory protection equipment is required, respirator selection is based on the chemical state, physical form of the hazard, and expected concentration of the contaminant. If employee exposure cannot be reasonably estimated, the atmosphere will be considered Immediately Dangerous to Life and Health (IDLH).

Only positive pressure SCBAs or positive pressure air line respirators with a full emergency egress bottle shall be used when an employee is exposed to hydrogen sulfide (H₂S), oxygen deficient (less than 19.5% O₂) or oxygen enriched (greater than 23.5%) atmospheres, IDLH, or an unknown atmosphere.

Prior to using respirators, and annually thereafter, workers must be medically evaluated, fit tested and trained. Fit tests must utilize the same manufacturer, style and size respirator that is assigned to the user. Advise your supervisor or Health and Safety staff of any medical, physical, or psychological condition that would impact respirator use.

Respirator users must confirm that nothing is allowed to interfere with a proper respirator to skin seal. This includes stubble (growth 24 hours old), mustache, sideburns, beard, or bangs.

Respirators must be inspected and correctly donned, pressure checked, cleaned, and stored. Any malfunction or problem with the respirator must be reported to your supervisor. Follow the procedures below to confirm correct respirator use.

POSITIVE AND NEGATIVE PRESSURE CHECKS

Negative Pressure Check

- Cover the inlet of the canister, cartridge(s) filter(s), or hose with the palms.
- Inhale gently so that the face piece collapses slightly and hold breath for ten second.
- If the face piece remains slightly collapsed and no inward leakage is detected, the respirator is properly donned, and the exhaust valve is functioning.

Positive Pressure Check

- Close off the opening of the exhalation valve by covering with the palm.
- Exhale gently into the face piece.
- If slight positive pressure can be built up inside the face piece without any evidence of outward leakage, the respirator is properly donned, and the intake valves are functioning.

CARTRIDGE CHANGEOUT

Select proper cartridges for air purifying respirators in accordance with usage charts, labels, and direction from Health and Safety staff. Install fresh sorbent cartridges at the start of the task requiring a respirator. Cartridges must be changed out and disposed of according to the end-of-service-life indicator (if available), at the end of the task or at the end of one 8-hour shift, whichever comes first. If the worker does detect an odor indicating breakthrough, the cartridge should be changed out immediately.

CLEANING AND STORAGE

Shared respirators must be cleaned after each use to confirm that the equipment is ready for the next user. Single user respirators may be cleaned as often as required. Between thorough cleaning, respirators can be wiped with alcohol-free disposable wipes.

Cleaning and Disinfecting

- Remove any filters, cartridges or canisters and discard as warranted (usually after 8 hours of use).
- Wash face pieces and breathing tubes in detergent and warm water (120° F) or cleaner-disinfectant solution. Use a hand brush to facilitate removal of dirt.
- Rinse completely in clean, warm water.
- Air-dry the equipment in a clean area.
- Clean other parts as recommended by manufacturer.
- Inspect valves, head straps and other parts and replace them with new parts if defective.

Storage

- Place the facemask in a plastic bag or container for storage.
- Emergency equipment shall be stored in its carrying case in a convenient location to facilitate easy access in an emergency situation. The storage area must be clearly identified, indicating the type of equipment, such as SCBA or air-purifying respirator.
- Routinely used respirators, such as dust respirators, may be placed in plastic bags and stored in clean cabinets in convenient locations in the work area, such as a warehouse.

Contractors using respiratory protection equipment while performing work at BP NAG sites will follow their company written program which must meet the requirements of the OSHA Respiratory Protection Standard and the BP NAG Respiratory Protection Program.



**WELDING, ARC / TORCH
CUTTING, BRAZING
(Hexavalent Chromium)**

Welding

WELDING, ARC / TORCH CUTTING, BRAZING (Hexavalent Chromium)

The Welding, Arc/Torch Cutting, Brazing document establishes minimum requirements associated with the above activities. Additional protective measures may be required in certain instances, particularly those involving confined spaces and excavation and trenching operations.

Potential hazards during these operations are (1) to the respiratory tract, from breathing metal fumes and gases, and (2) to the eyes ('flash burn') and skin (thermal burns or sunburn) from electric arc, molten metal, and ultraviolet radiation (UV). The hazard potential from metal fumes depends on the types of metals used, the concentration of metals in the welder's breathing zone and the duration of exposure. Most welding is performed using coated rods or electrodes whose coatings and cores contain metal oxides, hydroxides, carbonates, fluorides, and organic materials. Other materials, e.g. base metals and paint, encountered in welding and cutting processes may contain cadmium, chromium, nickel or lead; all of which can be toxic to humans.

GENERAL REQUIREMENTS

Welding, burning, brazing or related operations shall not be permitted in the following areas: sprinkled buildings while the sprinkler system is out of order, near large quantities of readily ignitable materials, such as bulk sulfur, or in the presence of an explosive atmosphere.

Supervisors/management must designate approved welding areas, confirm that welders are properly trained and qualified to perform the planned work activities, and that all welding, burning, brazing and related operations are authorized and permitted with qualified fire watches and proper fire protection equipment on-site prior to starting work. The Person in Charge must confirm that the presence of hazards, such as fumes, gases, electric shock, heat radiation

and noise are understood and communicated prior to starting work. Butane lighters shall not be allowed on the person of a welder or helper. Work must be discontinued immediately if conditions change from the approved work conditions.

High noise levels, commonly produced by welding, cutting, and grinding operations must be controlled at the source when possible. When control measures are unable to reduce exposures to acceptable levels, hearing protection such as ear muffs or ear plugs must be used.

Shield, guard or identify areas where hot materials remain from welding/cutting and may be unknowingly contacted by others. Welding fume should be exhausted away from the general work area or nearby workers. Protective screens or shields should permit air circulation at floor level and above the screen.

HARMFUL MATERIALS / METALS

Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, ozone, selenium, silver, and vanadium are materials found in consumables, base metals, coatings, etc. that may be encountered during welding, cutting or grinding operations and are known to be harmful at very low concentrations. Hexavalent chromium (Cr(VI)) is recognized as a human carcinogen. Unless breathing zone sampling has established that exposures are below allowable limits, local exhaust mechanical ventilation or respiratory protection must be used to protect welders, helpers and personnel working adjacent to these operations. Refer to the MSDS provided by the manufacturer to identify these or other harmful materials present in the rods, base metals, paint or coatings. Harmful or flammable materials may be present beneath patches or in seams.

The HSE Coordinator or Supervisor should send paint chips for lead analysis, confirm that the entire depth of paint is sampled and that any insulation to be removed does not contain asbestos.

Cleaning or degreasing operations involving chlorinated hydrocarbons must be positioned such that vapors will not reach or be drawn into areas with welding or cutting operations where exposed arc, flame or molten metal are or may be present. Vapors must also be kept from areas penetrated by the ultraviolet radiation of arc welding. The production of highly toxic phosgene gas may occur when chlorinated hydrocarbon vapors enter areas of welding operations.

EAR, EYE AND FACE PROTECTION

Flame-resistant ear plugs or equivalent must be used where hazards to the ear canal exist. Goggles with tempered lenses shaded in accordance with Table 1 or darker should be worn to protect eyes from injury and to provide good visibility of the work. Approved burning goggles must have safety lens on both sides of the filter lens.

Welding helmets equipped with auto-darkening filter lens are recommended. Welders who repeatedly use the neck muscles to flip the welding helmet up or snap it down are at risk for developing a painful and potentially permanent neck injury. The force required to flip the helmet can strain the neck muscles and compress the vertebrae in the upper spine. Over a period of time a musculoskeletal injury may develop. This type of injury may be avoided simply by using the hand to raise and lower the helmet or by using an auto-darkening filter lens. Welding helmets are not intended to protect against slag chips, grinding fragments, wire wheel bristles, or similar hazards. Spectacles with side shields or safety goggles worn in combination with face shields must be worn to protect against these hazards.

VENTILATION

Welders and cutters must take precautions to prevent breathing fumes directly. This may be done by the positioning of the work so that air flows across the face, not from behind, or use of ventilation that captures or directs the fumes away from the face. Natural ventilation is acceptable for

welding, cutting and other related operations where precautions have been taken to keep fumes from the welders breathing zone and air sampling shows that exposures levels are below allowable exposure limits.

Note: When using blowers or siphons to exhaust fumes, keep the exhaust inlet as close as possible to the work.

RESPIRATORY PROTECTION

A suitable fume respirator should be worn unless there is adequate local or natural ventilation. In most situations, protection against metal fumes can be obtained through the use of filter-type respirators fitted with a fume filter. Special consideration should be given to respiratory protection inside confined spaces. Some fume respirators may also have a chemical cartridge behind the filter to absorb low levels of gases and vapors that exist along with the fumes.

PROTECTIVE CLOTHING

Clothing must protect from sparks, flying slag, and radiation at all times. Clothing must be selected for its ability to minimize the potential for ignition, burning, trapping hot materials, or electric shock. Frayed materials are particularly susceptible to ignition and burning and should not be worn during welding or cutting. Sleeves and collars should be kept buttoned and front pockets eliminated if possible. When front pockets are present they should be emptied of flammable or readily combustible materials. Pants or coveralls should not have cuffs or be turned up on the outside and should overlap shoe or boot tops. **KEEP ALL CLOTHING AND PROTECTIVE APPAREL ABSOLUTELY FREE OF OIL AND GREASE.** Low shoes with unprotected tops are not suitable for work where there is possibility of sparks or slag getting inside shoes. Caps of flame-resistant materials, worn under helmets, may also provide protection against ear canal, neck or head burns.

WELDING AND CUTTING EQUIPMENT SAFETY

When using direct current (DC) or alternating current (AC), the welding operator must take special care to prevent electric shock. Welding lead terminals must be protected from accidental contact by personnel or other objects. Cables are to have no repairs or splices within 10 ft. (3 meters) from the electrode holder.

Place unused or spent welding rods or wire in suitable disposable containers, preferably metal recycle bins. They should never be left on the ground, or on walking/working surfaces.

Compressed gas cylinders must be legibly marked with either the chemical or the trade name of the gas. Cylinders must be secured to prevent falling. Oxygen cylinders must not be stored in the same compartment with acetylene, reserve stocks of calcium carbide or other fuel gas cylinders. Where cylinders are stored in the open, they should be protected from accumulations of ice and snow and from the direct rays of the sun.

Cylinders transported by motor vehicle must be secured and transported in accordance with U.S. DOT regulations. Regulators should be removed and valve protection caps hand tightened when cylinders are not in use or when they are being transported. Do not strike an arc on cylinders. If a leak in a fuel gas cylinder cannot be stopped, the cylinder must be moved to a safe location outdoors, away from any source of ignition, marked properly, and the supplier advised. When cylinders are hoisted, they must be secured on a cradle, rack, sling board, or pallet. They must not be hoisted or transported by means of magnets or choker slings. At a minimum, suitable approved flashback arrestors must be connected between both hose connections at the torch and routinely inspected to confirm that they are operative. Heat sensitive flashback arrestors that cutoff the flow of gas should also be attached to the outlet of both regulators.

Guide for Lens Shade Selection

(from AWS F2.2, Lens Shade Selector)

Shade numbers are given as a guide only and may be varied to suit individual needs.

Process	Electrode Size In (mm)	Arc Current (Amperes)	Minimum Protective Shade	Suggested* Shade No. (Comfort)
Shielded Meta Arc Welding (SMAW)	Less than 3/32 (2.4)	Less than 60	7	--
	3/32-5/32 (2.4-4.0)	60-160	8	10
	5/32-1/4 (4.0-6.4)	160-250	10	12
	More than 1/4 (6.4)	250-550	11	14
Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW)		Less than 60	7	--
		60-160	10	11
		160-250	10	12
		250-500	10	14
Gas Tungsten Arc Welding (GTAW)		Less than 50	8	10
		50-150	8	12
		150-500	10	14
Air Carbon Arc Cutting (CAC-A)	(Light)	Less than 500	10	12
	(Heavy)	500-1000	11	14
Plasma Arc Welding (PAW)		Less than 20	6	6 to 8
		20-100	8	10
		100-400	10	12
		400-800	11	14
Plasma Arc Cutting (PAC)		Less than 20	4	4
		20-40	5	5
		40-60	6	6
		60-80	8	8
		80-300	8	9
		300-400	9	12
		400-800	10	14
Torch Brazing (TB)		--	--	3 or 4
Torch Soldering (TS)		--	--	2
Carbon Arc Welding (CAW)		--	--	14
Plate Thickness				Suggested Shade No. (Comfort)
		in.	mm.	
Oxyfuel Gas Welding (OFW) Light Medium Heavy	Under 1/8	Under 3		4 or 5
	1/8 to 1/2	3 to 13		5 or 6
	Over 1/2	Over 13		6 or 8
Oxygen Cutting (OC) Light Medium Heavy	Under 1	Under 25		3 or 4
	1 to 6	25 to 150		4 or 5
	Over 6	Over 150		5 or 6

*As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding, cutting, or brazing where the torch and/or the flux produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line of the visible light spectrum.

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NAG SPU ONSHORE US DOCUMENT REFERENCES

Document References

Complete Onshore US Document Reference

The HS handbook is a condensed version of the most commonly used Document across the NAG SPU Onshore US, The controlled version of these documents can be found in the NAG SPU Onshore US Health & Safety Manual located at:

<http://naghsse.bpweb.bp.com>

NAG SPU Onshore US Health & Safety Manual Documents:

Access to Employee Exposure and Medical Records (K0000000415)

Asbestos Management (K0000002595)

- NAG Asbestos Management Manual - Colorado (K0000002618)
- NAG Asbestos Management Manual - Kansas (K0000002619)
- NAG Asbestos Management Manual - New Mexico (K0000002620)
- NAG Asbestos Management Manual - Oklahoma (K0000002621)
- NAG Asbestos Management Manual - Wyoming (K0000002622)

Benzene Compliance (K0000002613)

Blinding and Equipment Isolation (K0000000451)

Bloodborne Pathogens Exposure Control Program (K0000000419)

Bulletin Boards (K0000000420)

Combustible and Flammable Liquid Storage (K0000000452)

Compressed Gases and Air (K0000000453)

Confined Space Entry (K0000000438)

Contractor HSSE Performance Evaluation (K0000001183)

Control of Work Policy (K0000002586)

Defeated Safety Systems (K0000000454)

Document Management Process (K0000002609)

Driving Safety (K0000000488)

- Vehicle Inspection Checklist (K0000000490)
- Onshore US Pre-Trip Assessment Guidance (K0000000492)
- Safe Fueling Guidance (K0000000493)
- BP Group Light Vehicle Safety Features (K0000001815)
- Load Binder (K0000000489)
- Driving Risk Assessment (K0000000496)
- Safe Load Securing Guidelines (K0000000497)
- General Spotter Requirements (K0000002047)

Electrical Safety Program (K0000000440)

Emergency Shutdown Systems (K0000000455)

Fall Protection (K0000000450)

Fire Protection Program (K0000000441)

First Aid Material and Training (K0000000422)

Flammable and Combustible Gas Monitors, Use, and Calibration (K0000000442)

Flare Gun Program (K0000000472)

Forklift and Industrial Truck Operation (K0000000443)

Government Inspections (K0000000423)

Ground Disturbance, Excavations, Trenching, and Shoring (K0000000456)

- **Ground Disturbance Flow Chart-NAG SPU (K0000001106)**
- Construction Checklist for Trenching (K0000000487)
- Ground Disturbance Permit (K0000000482)
- Maximum Allowable Slopes & Excavations by Soil Type (K0000000485)
- OSHA Soil Classification (K0000000483)
- Soil Analysis Tests (K0000000484)
- Trench Safety Daily Field Report (K0000000486)
- BP Crossing/Encroachment Information & Guidelines (K0000001671)
- Excavation Protective Systems (K0000001105)
- Minimum Recommended Training for Line Locator Personnel (K0000001119)

- Best Practices:
 - Exposing Pipelines (K0000001093)
 - Backfilling Procedure (K0000001094)
 - Pipeline Repair and Modification (K0000001095)
 - Probing Procedure (K0000001096)
 - Driving T-Posts (K0000001097)
 - Gas Pipeline Deactivation and Abandonment Procedures (K0000001098)
 - Pipeline Purging Procedure (K0000001099)
 - Maintenance & Installation of Pipeline Warning Signs and Markers (K0000001100)
 - Installation & Maintenance of Non-Metallic Pipelines (K0000001101)
 - Application of Protective Coatings (K0000001102)
 - Minimum Requirements for Damage Prevention (K0000001103)
 - Pipeline Mapping Systems (K0000001118)

Grounding and Bonding Procedures (K0000000457)

HAZWOPER (K0000000425) (Handbook includes only the Decision Tree Diagram)

Hazard Communication Program (K0000000424)

Hearing Conservation (K0000000426)

Hot Oiling and Similar Open Flame Equipment (K0000000591)

Hot Tapping (K0000000459)

Hot Work (K0000000460)

Hydrogen Sulfide (K0000000436)

Initial Internal HSSE & Integrity Management Incident Reporting, Investigation, and Tracking (K0000000417) (Handbook includes only the Flowchart)

Job Safety Environmental Analysis (JSEA) Procedure (K0000002588)

Laboratory Safety (K0000000444)

Ladder Inspection and Use (K0000000461)

Lead Management (K0000002614)

Lead Operations & Maintenance Material Link (K0000001816)

Lifting Operations (K0000000439)

- Mobile Crane Operator Daily Inspection Checklist (K0000000474)
- Crawler, Truck, & Wheel Mounted Crane Inspection Checklist (K0000000475)
- Hardware, Chains, Wire Rope, Slings Checklist (K0000000476)
- Load Path Inspection - Well Servicing Rig Checklist (K0000000477)
- Load Path Inspection - Drilling Rig Checklist (K0000000478)
- Onshore US Lifting Permit (K0000000479)
- Winch Truck Inspection Checklist (K0000000473)
- Critical Lift Permit (K0000001299)

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- FRC Guidance Document for BP Personnel only (K0000001301)
- Home Laundering & Maintenance of CXP Nomex Garments (K0000001302)
- Managing the Heat - Safely Introducing FRC Presentation (K0000001303)
- Hard Hat Inspection Replacement Requirements (K0000001304)

Pipeline Repair Procedures (K0000000464)

Pressure/Vacuum Safety Valves and Rupture Disks (K0000000465)

Process Safety Management (K0000000448)

Purging Air from Piping and Vessels in Hydrocarbon Services (K0000000466)

Recordkeeping (K0000000430)

Respiratory Protection Program (K0000000449)

- Tank Gauging JSEA (K0000000398)
- Periodic Respirator User Questionnaire (K0000000386)
- Bottled Air System Installation Checklist (K0000000399)
- Breathing Air Compressor Installation Checklist (K0000000400)
- Breathing Air Systems Daily Operations Checklist (K0000000401)
- Monthly Respirator Inspection Record (K0000000404)
- Checklist for Respiratory Program Evaluation (K0000000402)
- Job Exposure Profile Tech II and III (K0000000410)
- Respiratory Protection Program Audit Protocol (K0000000412)
- Safety Handbook Respiratory Program (K0000000414)
- Respirator Selection Checklist (K0000000406)

Safety Signs and Color Coding (K0000000467)

Scaffolding (K0000000468)

Short Service Employee Management (K0000000435)

Tank and Vessel Cleaning Procedure (K0000000469)

Traction Reporting Quick Guide (K0000000413)

Transportation of Hazardous Materials (K0000000433)

Visitor's Safety Program (K0000000434)

Welding, Arc / Torch Cutting, Brazing (Hexavalent Chromium) (K0000002921)

Working on Tank Tops (K0000002589)

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