

CAERUS OIL AND GAS, LLC

HEALTH & SAFETY PLAN

Introduction

**Prepared
April 2016 By:**



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1.0 INTRODUCTION

This Health & Safety Plan is prepared for the use by Caerus Oil and Gas, LLC (Caerus) to reduce injuries, illnesses and fatalities in the workplace by systematically achieving compliance with OSHA standards.

This Health & Safety Manual is being furnished to all Caerus employees in an effort to develop safety awareness and thereby prevent personal injury both on and off the job. It covers many situations you may encounter and provides safe and environmentally sound principles for you to follow, but it cannot cover every situation that arises, nor can every proper practice be listed. By following the guidelines set forth in this manual, using good judgment, and always being mindful of safety and environmental issues, all facilities can be operated in a safe and environmentally sound manner. Federal, state, and local laws from which much of this material was derived, are by extension, to be considered a part of this manual and must be followed. It is the responsibility of each employee to protect themselves, their fellow workers, the public and the environment. You are urged to become familiar with this manual, refer to it frequently and to comply with all the principles contained herein.

If you have any questions regarding this manual or the means necessary to operate safely and in an environmentally sound manner, please discuss them with your supervisor or manager.

1.1 PURPOSE

The purpose of the Health & Safety Plan is to reduce the number and severity of job-related injuries and illnesses at all Caerus Oil and Gas, LLC facilities.

1.2 SCOPE

The Health & Safety Plan has been developed to comply with the requirements established by the Occupational Safety and Health Administration (OSHA). As outlined in Title 29 of the Code of Federal Regulations (CFR), Section 1910, the plan addresses the following:

- 1) Management leadership and employee participation;
- 2) Hazard identification and assessment;
- 3) Hazard prevention and control;
- 4) Information and training; and
- 5) Evaluation of program effectiveness.

1.3 HEALTH & SAFETY PLAN ORGANIZATION

The Health & Safety Plan is divided into the following sections and their corresponding federal regulations:

Section 1 – Introduction
Section 2 – Confined Space
Section 3 – Driving Safety

- Section 4 – Elevated Work Surfaces and Fall Protection
- Section 5 – Fire Prevention and Protection
- Section 6 – First Aid and Bloodborne Pathogens
- Section 7 – Hydrogen Sulfide Gas
- Section 8 – Hazard Communication
- Section 9 – Hearing Conservation
- Section 10 – Hot Work
- Section 11 – Lock Out / Tag Out
- Section 12 – Naturally Occurring Radioactive Materials (NORM)
- Section 13 – Personal Protective Equipment
- Section 14 – Respiratory Protection
- Section 15 – Walking-Working Surfaces

1.4 RESPONSIBILITIES FOR IMPLEMENTING THE HEALTH & SAFETY PLAN

MANAGEMENT LEADERSHIP AND EMPLOYEE PARTICIPATION

Caerus Management is responsible for implementing the Health & Safety Plan through the following procedures:

- Establish the program responsibilities of managers, supervisors, and employees for safety and health in the workplace and hold them accountable for carrying out those responsibilities.
- Provide managers, supervisors, and employees with the authority, access to relevant information, training, and resources they need to carry out their safety and health responsibilities.

To encourage employee participation, Caerus Management will perform the following tasks:

- Regularly communicate with employees about workplace safety and health matters.
- Provide employees with access to information relevant to the program.
- Establish a way for employees to report job-related fatalities, injuries, illnesses, incidents, near misses and hazards promptly and to make recommendations about appropriate ways to control those hazards.
- Provide prompt responses to such reports and recommendations.
- Caerus Management will not discourage employees from making reports and recommendations about injuries, illnesses, incidents, hazards, or fatalities in the workplace, or from otherwise participating in the workplace safety and health program.

HAZARD IDENTIFICATION AND ASSESSMENT

Caerus Management will perform the following functions to systematically identify and assess hazards to which employees are exposed and assess compliance with applicable OSHA standards:

- Conduct inspections of the workplace.

- Review safety and health information.
- Evaluate new equipment, materials, and processes for hazards before they are introduced into the workplace and as often thereafter as necessary to ensure compliance with OSHA standards, and at least every two years thereafter.
- When safety and health information or a change in workplace conditions indicates that a new or increased hazard may be present.
- Caerus Management will investigate each work-related death, serious injury or illness, or incident (near miss) having the potential to cause death or serious physical harm.
- Caerus Management will keep records of the hazards identified and their assessment and the actions that they have taken or plan to take to control those hazards.

HAZARD PREVENTION AND CONTROL

Caerus Management will comply with the hazard prevention and control requirements of applicable OSHA standards such as Hazard Communication, Confined Space Entry, Hot Work, Lockout/Tagout, and others related to specific job sites.

INFORMATION AND TRAINING

Caerus Management will ensure that each employee is provided with information and training on the Health & Safety Plan, all hazards to which they may be exposed, and what is being done to control these hazards.

New employees will be trained before their initial assignment to any job involving exposure to a hazard, and periodically thereafter to ensure that they remain adequately trained. Employees will also be retrained whenever a new or increased hazard is introduced into the workplace.

CONTRACTORS

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local regulations. Despite operational urgency or importance, work shall not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own safety program and examine the related codes and standards applicable to their services. At a minimum, contractors should:

- Comply with all applicable Federal, State, and local regulations;
- Report all near misses and incidents to Caerus.
- Correct observed unsafe acts and report unsafe conditions to Caerus Management;
- Contractor personnel should use appropriate PPE necessary to safely perform their work;
- Should any doubt arise as to the meaning or interpretation of Caerus expectations, the Contractor shall consult with the Caerus management.

CAERUS OIL AND GAS, LLC HEALTH & SAFETY PLAN

Confined Space Program

**Prepared
April 2016 By:**



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1.0 CONFINED SPACES

The Confined Space Program is prepared for the use by Caerus Oil and Gas, LLC (Caerus) to ensure that Employees are protected from any hazards posed by confined spaces in the workplace. It is important that all Caerus Employees who may enter any sort of a confined space be adequately trained regarding the possible hazards and appropriate safety procedures.

Over 60% of confined space fatalities are would-be rescuers, who enter the confined space to help another person. It is important that all Employees understand the hazards of confined spaces, even if they never plan to enter one.

1.1 PURPOSE

The purpose of the Confined Space Program is to identify permit-required confined spaces and establish procedures and training requirements for Employees entry into the spaces. The program establishes an entry permit system that ensures hazards are evaluated and proper precautions are taken to provide safety to Employees prior to and during confined space entry operations. The Confined Space Program has been developed to comply with the requirements established by 29 CFR Part 1910.146.

1.2 SCOPE

The Occupational Safety & Health Administration (OSHA) defines a Confined Space as 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.

Caerus will identify permit-required confined spaces and Employees shall follow the safe work practices and procedures outlined in this program. A Confined Space Permit (Sec. 5.4.4) must be used to evaluate and document hazards associated with entering a confined space. If the hazards cannot be eliminated, control measures will be implemented to ensure the safety of Employees entering the confined spaces.

The provisions of this program apply to both **permit-required confined spaces** and **non-permit confined spaces**. Caerus Employees will assume that all confined spaces are permit-required confined spaces until it is proven otherwise.

2.0 RESPONSIBILITIES

The following responsibilities are assigned to Caerus Supervisors, Entry Supervisors, Authorized Entrants, Attendants, Testers, and Rescue Services. These terms are defined in 29 CFR Part 1910.146.

2.1 EMPLOYEE RESPONSIBILITIES

- Be knowledgeable of the provisions of this program and participating in training when requested;
- Understand that over 60 percent of confined space fatalities are would-be rescuers;
- Perform assigned duties based on their role in confined space entry operations;
- Adhere to the procedures outlined in this program;
- Participate in post-entry communications with the Caerus Entry Supervisor to determine or note any program deficiencies or hazards confronted or created during the entry.
- Report all Near Misses and Incidents to Caerus management;

2.2 FIELD SUPERVISOR AND MANAGEMENT RESPONSIBILITIES

- Implement, support and enforce the Confined Space Entry Program;
- Ensure all Employees and applicable contractors are trained and adhere to Permit Required Confined Space Entry Procedures;
- Assign the duties and responsibilities for confined space entry procedures;
- Identify all permit-required and non-permit confined spaces at each facility;
- Provide guidance on approved alternate entry procedures and supporting documentation required for utilizing alternate entry procedures;
- Effectively communicate the existence of confined spaces to all exposed Employees including contract Employees. Note: Signs and labels are the preferred method for marking permit-required confined spaces. The wording should be as follows: DANGER. CONFINED SPACE. ENTER BY PERMIT ONLY.
- Ensure Employees receive adequate training for the job duties they perform;
- Ensure that necessary steps are taken to comply with the established requirements for entering and performing work within confined spaces;
- Ensure that Employees have the proper equipment for entering confined spaces;
- Conduct periodic audits of Confined Space Entry procedures, Safe Work Permits and Alternate Entry Procedures certifications, and correcting any deficiencies that are noted.
- Maintain inspection records.

2.3 ENTRY SUPERVISOR RESPONSIBILITIES

"Entry supervisor" means the person (such as the employer, foreman, or crew chief) 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 by this section.

- Know the hazards that could be encountered during the entry including hazard exposure mode (skin contact, inhalation, etc.), exposure symptoms or signs, and the consequences of an exposure;
- Communicate tasks, entry procedures, and hazards of the confined space to all Employees and contractors involved in the job in a pre-entry meeting;
- Sign the completed Safe Work Permit at the time of assuming the Entry Supervisor responsibilities;
- Verify that the appropriate entries have been made on the Safe Work Permit, that all tests specified on the permit have been conducted, and that all precautions, procedures and equipment specified on the permit are in place before signing the permit and allowing entry to begin;
- Coordinate all entry operations;
- Terminate the entry, documenting any occurrence of a non-authorized condition on the Safe Work Permit and ensuring the permit is cancelled properly;
- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations;
- Ensure proper precautions and procedures have been implemented for the protection of Employees working in or near the permit required confined space;
- Conduct post-entry communications with Caerus Employees and contract Employees involved in the permit-required confined space entry to determine if there were any program deficiencies or hazards confronted or created during the entry and documenting such hazards or deficiencies on the Entry Permit;
- Complete and approve the "Alternate Entry Procedures Certification Form" and ensuring that all conditions are met before Employees enter any permit-required confined space using alternate entry procedures.
- Determine if non-entry rescue is feasible or if a rescue service will be used (See Rescue section);
- If non-entry rescue is feasible, ensure entrants are properly equipped with rescue equipment and adequate retrieval systems are in place.
- If a rescue service is used, confirm that the rescue service is onsite and that the means for summoning them are operable (i.e., does the cell phone work at that location?).

2.4 AUTHORIZED ENTRANTS RESPONSIBILITIES

"Authorized entrant" means an Employee who is authorized by the employer to enter a permit space.

- Know the hazards that could be encountered during the entry including hazard exposure mode (skin contact, inhalation, etc.), exposure symptoms or signs, and the consequences of an exposure;
- Know how to properly use all equipment necessary to perform the entry and complete the task safely (i.e. rescue/retrieval equipment, lighting, monitoring equipment, communications equipment, etc.);
- Refuse to enter a permit-required confined space if they do not feel sufficiently trained or that the appropriate resources are not available;
- Communicate with the attendant so the attendant can monitor entrants status and the attendant can alert entrants of the need to evacuate the permit space if necessary;
- Alert the attendant when warning signs or symptoms of exposure to a dangerous situation are recognized or whenever a prohibited condition is detected;
- Immediately exit from the permit space when instructed to do so by either the attendant or the entry supervisor, when any warning sign or symptom of exposure to a dangerous situation has been recognized, upon detection of a prohibited condition, or upon the activation of an evacuation alarm.

2.5 ATTENDANT RESPONSIBILITIES

"Attendant" means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

- Know the hazards that could be encountered during the entry including hazard exposure mode (skin contact, inhalation, etc.), exposure symptoms or signs, and the consequences of an exposure;
- Be aware of possible behavioral effects of hazard exposure in authorized entrants;
- Communicate with the authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space if necessary;
- Continuously maintain an accurate count of authorized entrants in the permit space;
- Remain immediately outside of the permit space during entry operations until relieved by another attendant;
- Observe activities inside and outside of the permit space to determine if it is safe for entrants to remain in the space;
- Order authorized entrants to evacuate the permit space immediately if:
 - 1) A prohibited condition is detected;
 - 2) Behavioral effects of hazard exposure in the authorized entrants is detected;
 - 3) A situation outside the confined space that could endanger the authorized entrants is detected;
 - 4) The attendant cannot effectively and safely perform all of the required and delegated duties.
- Perform non-entry rescues utilizing retrieval lines, whenever possible;
- Summon rescue and emergency services as soon as it is determined that entrants may need assistance evacuating the space;

- Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - 1) Warn the unauthorized persons that they must stay away from the permit space;
 - 2) Advise the unauthorized persons to leave immediately if they have entered the permit space;
 - 3) Inform the authorized entrants and the supervisors if unauthorized persons enter the permit space.
- Perform no other duties that might interfere with monitoring and protecting the authorized entrants.

2.6 PERMIT ISSUERS RESPONSIBILITIES

"Permit issuer" means the person responsible for issuing permits for entry and for returning to the permit space to service following termination of entry.

- Know the hazards that could be encountered during the entry including hazard exposure mode (skin contact, inhalation, etc.), exposure symptoms or signs, and the consequences of an exposure;
- Issue the Safe Work Permit that authorizes entry into a permit-required confined space and ensuring the accuracy of all information contained on the permit;
- Terminate the entry if an emergency arises or when hazardous conditions exist;
- Cancel the permit as indicated under : "Entry Permit Cancellation";
- Verify that non-entry rescue is feasible or if a rescue service is used, confirm that the rescue service is readily available and the means for summoning them are operable;
- If the Permit Issuer is also the Entry Supervisor, then all responsibilities under Entry Supervisor shall also be performed.

2.7 ATMOSPHERIC TESTERS RESPONSIBILITIES

Atmospheric Tester means the person responsible for testing for "Hazardous atmospheres" which are atmospheres that may expose Employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness.

- Be competent (by virtue of training and/or experience) in the field calibration and use of the instrumentation to be utilized;
- Perform required atmospheric monitoring for every permit-required confined space entry;
- Know the hazards that could be encountered during the entry including hazard exposure mode (skin contact, inhalation, etc.), exposure symptoms or signs, and the consequences of an exposure;
- Advise entry Employees of monitoring results;
- Ensure that monitoring results are accurately documented on the Safe Work Permit.

2.8 RESCUE SERVICES RESPONSIBILITIES

"Rescue service" means the Employees designated to rescue Employees from permit spaces.

- Know the hazards that could be encountered during the entry including hazard exposure mode (skin contact, inhalation, etc.), exposure symptoms or signs, and the consequences of an exposure;
- Evaluate permit spaces and developing appropriate rescue plans for rescuing entrants from inside the space;
- Perform rescue operations, which may require entry into the permit space;
- Properly use the personal protective equipment (PPE) and rescue equipment necessary to rescue Employees from confined spaces;
- Maintain proficiency in the rescue of Employees by practicing simulated rescues at least once every twelve (12) months;
- Maintain proficiency in the rescue of Employees from spaces with configurations similar to the subject confined space;
- Receive basic first-aid and cardiopulmonary resuscitation (CPR) training and ensuring that at least one member of each rescue team holds current certification in first-aid and CPR.

2.9 CONTRACTOR RESPONSIBILITIES

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local laws, rules and regulations. Despite operational urgency or importance, work shall not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own safety program and examine the related codes and standards applicable to their services. At minimum contractors should:

- Comply with all applicable Federal, State, and local laws, rules and regulations;
- Ensure that all Employees are trained for the confined space duties they are expected to perform;
- Document training of Employees and keep records of training;
- Adhere to the procedures outlined in this program and understand that only certified confined space entrants are allowed to perform confined space work activities;
- Report all Near Misses and Incidents to Caerus management;
- Report unsafe conditions as defined by 29 CFR Part 1910.146;
- Should any doubt arise as to the meaning or interpretation of Contractor responsibilities, the Contractor should consult with the Caerus Management.

3.0 TRAINING

Sufficient training will be provided for each person affected by this program. Training must be thorough enough to ensure that Employees can safely perform their assigned duties or responsibilities in accordance with all requirements of this program.

Training will be provided before an Employee is assigned confined space entry duties, when there is a change in assigned duties or a change in confined space operations that present a hazard for which training has not been previously conducted, and whenever deficiencies are noted in any permit space entry operation. Periodic refresher training shall be provided for all Employees who are assigned confined space entry responsibilities.

3.1 GENERAL TRAINING FOR ALL CONFINED SPACE EMPLOYEES

All Caerus Employees responsible for supervising, planning, entering or participating in confined space entry and/or rescue shall be trained in the following areas:

- General hazards associated with confined spaces;
- Specific confined space hazards associated with each facility or location;
- Terminology and definitions;
- Program requirements for standard entry procedures and alternate entry procedures;
- The reason for, proper use, and limitations of PPE and other safety equipment required for entry into confined spaces;
- Criteria and requirements for non-entry and entry rescue;
- Methods to prepare a confined space for entry, including necessary equipment, proper isolation and methods for eliminating or controlling hazards;
- The Safe Work Permit system and other procedural requirements for conducting a confined space entry;
- Duties and responsibilities as a member of the confined space entry team;
- How to recognize probable air contaminant overexposure symptoms in themselves and co-workers;
- Methods for alerting attendants;
- Responding to emergencies;
- Physical barriers to protect entrants and to keep unauthorized Employees from falling into the confined space.

3.2 TRAINING FOR ENTRY SUPERVISORS AND/OR PERMIT ISSUERS

Training for Entry Supervisors and/or Permit Issuers shall include the following (in addition to the training requirements under General Training):

- A thorough discussion of the Responsibilities for Entry Supervisors/Permit Issuers section of the Program;

- A detailed explanation of the permit system and other procedural requirements for conducting a confined space entry;
- Identification of confined space hazards;
- Pre-entry considerations;
- An explanation of atmospheric monitoring procedures and results;
- Selection of proper PPE;
- Post entry evaluations to ensure that any deficiencies in the Confined Space Program are noted and addressed.

3.3 TRAINING FOR ATTENDANTS

Training for Attendants shall include the following (in addition to the training requirements under General Training):

- A thorough discussion of the Responsibilities for Attendants section of the Program;
- Means to maintain an accurate count of entrants within the confined space;
- Dealing with unauthorized Employees;
- Proper use of equipment used for communicating with entry and/or emergency/rescue Employees;
- Hazard recognition;
- Conditions for ordering immediate evacuation of entrants;
- Performing non-entry rescue operations;
- Summoning rescue or other emergency services;
- Requirements to never enter a confined space to rescue an entrant without the appropriate PPE and someone replacing him/her as the Attendant.

3.4 TRAINING FOR ATMOSPHERIC TESTERS

Training for Atmospheric Testers shall include the following (in addition to the training requirements under General Training):

- A thorough discussion of the Responsibilities for Testers section of the Program;
- The proper use of atmospheric monitoring instruments, including field calibration;
- A thorough knowledge of the work being performed;
- Recognition of hazardous contaminants anticipated in the confined space;
- Any process which could significantly alter the original conditions inside or outside the confined space;
- Duties and responsibilities of an Atmospheric Monitoring Person (Tester).

3.5 TRAINING FOR EMERGENCY RESPONSE EMPLOYEES

Training for Emergency Response Employees shall include the following (in addition to the training requirements under General Training):

- A thorough discussion of the Responsibilities for Emergency Response Employees section of the Program;
- The rescue plan and procedures developed for each type of confined space they are anticipated to encounter;
- Use of emergency rescue equipment;
- Basic first aid and CPR techniques;
- Use of appropriate PPE;
- Participation in mock confined space rescues.

4.0 DOCUMENTATION

Employee training records, copies of the Confined Space Program, Confined Space Entry Permits, Annual Inspection Reports, and Alternate Entry Procedure Certifications must be retained for the length of time specified in the following table.

Safe Work Permits for all confined space entries must be retained for 30 years since they contain atmospheric monitoring results and are considered industrial hygiene monitoring records.

RECORD	CUSTODIAN	RETENTION
Safe Work Permit (Confined Space Entry & Attachments)	Caerus Corporate Office	30 years
Alternate Entry Procedure Certification	Caerus Corporate Office	30 years
Employee Training Records	Caerus Corporate Office	30 years after separation
Annual Inspection Reports/Information	Caerus Corporate Office	7 years
Confined Space Entry Program	Caerus Corporate Office	1 year after revised superseded, or obsolete

5.0 PROCEDURES

5.1 CONFINED SPACE PREPARATION AND ENTRY PROCEDURES

5.1.1 UNAUTHORIZED ENTRIES

Measures will be taken to prevent unauthorized entries into permit-required confined spaces. Acceptable means will be accomplished, at a minimum, through one or more of the following:

- Posting of danger signs, labels, and/or physical barriers;
- Restricting access so the only means of entry requires tools or keys;
- Training and orientation programs (General Awareness).

5.1.2 PRE-ENTRY MEETING

A pre-entry meeting must be conducted with all persons involved in the proposed confined space work. The meeting shall cover the basic steps for the confined space entry, a review of the specific conditions and precautions to be listed on the entry permit, a review of expected and potential hazards, and Material Safety Data Sheets (MSDSs) for any products to which the entrants may be exposed. The information should be recorded on the Safe Work Permit.

NOTE: The Safe Work Permit and the Confined Space Entry Permit are not interchangeable documents. BOTH forms must be completed for Permit-Required Confined Space entries. The Safe Work Permit is a separate document that may be used for purposes other than Confined Space entries. The Confined Space Entry Permit is available in Section 5.4.4.

5.1.3 ISOLATION AND LOCKOUT/TAGOUT

Before entry is allowed into a permit required confined space, the space must be properly isolated to eliminate or control hazards. All pipes and tubing leading into or out of the space must be skillet blinded, have a double block and bleed or be physically disconnected as close to the confined space as possible or have sections removed. When lines are disconnected, they must be blind flanged, capped, or plugged.

An alternative to this procedure is to shut-in the facility, bleed all pressures to atmospheric pressure, and have a valve closed (locked and tagged) on each line connected to the space, as near to the space as possible. Continuous atmospheric monitoring may be necessary during this procedure. Isolation procedures will include work practices requiring the physical verification that the bleed or vent valve is functioning properly and not plugged.

ALL ENERGY ISOLATIONS (lockout/tagout) must be performed in accordance with established Caerus procedures (See Lockout/Tagout Program).

5.1.4 CLEANING

Depending upon the nature of the contents, the confined space should be emptied and made as clean and free as possible of residue. This should be done by hot or cold-water washing, steaming, chemical neutralization, or by purging with air or nitrogen, with vapors being safely vented away from the confined space.

After the material in the confined space has been evacuated, the remaining sludge should be removed to the greatest extent possible, working from the outside of the confined space.

Materials removed from the confined space should not be allowed to flow onto, contaminate or pollute nearby areas. Disposal of the materials should be in accordance with the state and local regulations.

5.1.5 VENTILATION

The confined space must be ventilated to remove toxic and/or explosive vapors. The space will be continuously ventilated if the work in progress tends to create fumes (i.e., welding, cutting, coating, removal of sludge) or if necessary to maintain an acceptable atmosphere. Ventilation may also be required to control temperature conditions within the space.

Oxygen or inert gases shall not be used to ventilate a confined space. When mechanical ventilation is necessary, the equipment should be suitable for use in hazardous locations and shall be bonded, when applicable, to avoid a static charge buildup. Precautions are to be taken to ensure that only fresh uncontaminated air is being forced into the space. In some instances, it may be necessary to use a flexible duct to carry expelled gases away from the work area.

5.1.6 ATMOSPHERIC MONITORING (TESTING)

A person competent in the use of monitoring instruments will be designated to test for hazards within the confined space prior to entry. The tests should be performed in the following sequence using a calibrated detection instrument and documented on the Caerus Safe Work Permit form and Confined Space Entry Permit (Sec. 5.4.4).

- Oxygen (O₂) concentration;
- Flammable concentration;
- Toxic substance concentration (hydrogen sulfide [H₂S], sulfur dioxide [SO₂], benzene, etc.);
- Naturally Occurring Radioactive Material (NORM);
- Any other hazards condition which might be suspected.

5.1.7 ACCEPTABLE ENTRY CONDITIONS

Oxygen (O₂) Concentration

- Less than 16% - Entry shall **NOT** be made into an atmosphere containing less than 16% oxygen by volume except under emergency circumstances to perform rescue operations utilizing specialized equipment (i.e. supplied air respirators) as necessary to ensure the safety of Employees.
- 16% - 19.4% - Entrants must wear supplied air respirators.
- 19.5% - 23.5% - Confined space entry without a supplied air respirator is acceptable, provided that all other exposure limits are met (Lower Explosive Limit [LEL], toxicity, etc.).
- Greater than 23.5% - Entry shall **NOT** be made into an oxygen-enriched atmosphere except under emergency circumstances to perform rescue operations utilizing specialized equipment (i.e. supplied air respirators) as necessary to ensure the safety of Employees.

Flammable Concentration

The Lower Explosive Limit (LEL) is the lowest concentration at which a gas or vapor is flammable or explosive at ambient conditions.

- 0% - 10% LEL – Entry without supplied air respirator is acceptable provided that all other occupational exposure limits are not exceeded (oxygen, toxicity, etc.). Hot work is **NOT** permitted above 0% LEL.
- Greater than 10% LEL – Entry shall **NOT** be made into an atmosphere in excess of 10% of the LEL except under emergency circumstances to perform rescue operations utilizing specialized equipment as necessary to ensure the safety of Employees.

Toxic Substance Concentration

Toxic substances may include hydrogen sulfide (H₂S), sulfur dioxide (SO₂), Benzene, etc. Entry without a supplied air respirator is acceptable, provided that all contaminant concentrations are within the established occupational exposure limits and there is no oxygen deficiency. For contaminant concentrations in excess of established limits, entry is authorized when appropriate respiratory protection equipment is worn. See the Caerus Respiratory Protection Program for detailed requirements and appropriate equipment selection.

Naturally Occurring Radioactive Material (NORM)

Exposure to Naturally Occurring Radioactive Material (NORM) is possible throughout the oil and gas industry. Appropriate measures must be taken to restrict or limit Employee exposure. See the Caerus NORM Program for additional information on evaluation and control of personal exposures to NORM.

Other Considerations

Other conditions that may require additional precautions to ensure safe confined space entry include:

- Temperature extremes;
- Vapors or fumes generated by job tasks;
- Chemical irritants;
- Noise levels;
- Poor lighting;
- Falling objects;
- Slipping and tripping hazards;
- Moving parts;
- Poisonous snakes; scorpions, insects and spiders.

5.2 EQUIPMENT REQUIRED FOR CONFINED SPACE ENTRY

5.2.1 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) appropriate to the hazards must be worn when working in a confined space. Appropriate PPE may include head protection, steel-toed footwear, approved eye and face protection, protective clothing, respiratory equipment, hearing protection, personal monitors, and a safety harness (chest or full body) attached to a lifeline.

NOTE: Refer to other Caerus Programs (i.e., Respiratory Protection, Personal Protective Equipment, Hydrogen Sulfide, etc.) for more information detailed specific requirements, necessary training, and limitations for use of PPE.

5.2.2 COMMUNICATIONS EQUIPMENT

Communications equipment must be provided in those instances where direct visual contact or other effective means of communication cannot be maintained at all times between the attendant and all entrants. The communications equipment used shall meet minimum electrical classification standards for the area. Cell phones should be tested to confirm that there is adequate reception in the area of the confined space. Communications information shall be documented on the Caerus Safe Work Permit form.

5.2.3 LIGHTING

Adequate lighting must be provided where necessary to enable entrants to safely enter and complete the assigned task. The lighting equipment used shall meet minimum electrical classification standards for the area.

NOTE: All portable electrical lighting and equipment shall be protected with ground fault circuit interrupter (GFCI) protection. Where portable generators are used for lighting power supply, low voltage lighting (24 volts or less) shall be used.

5.2.4 BARRIERS

Sufficient barriers will be provided around the permit-required confined space opening to:

- Prevent unauthorized and accidental entry (falls) into the confined space;
- Protect the entrants inside of the confined space from objects and persons outside of the confined space.

5.2.5 OTHER EQUIPMENT

Equipment necessary to ensure safe entrance to and exit from the permitted space shall be provided (ladders, mechanical lifting devices, scaffolding, powered platforms, etc.).

Powered tools and equipment used in the permit space must meet minimum electrical classification standards and plugged into a circuit protected by a ground fault circuit interrupter (GFCI) to protect Employees from electrical shock.

Battery powered electrical devices shall be approved for use in accordance with the area classification.

5.3 RESCUE

5.3.1 NON-ENTRY RESCUE

Non-entry rescue is the preferred method for use at Caerus. Non-entry rescue is performed from outside the confined space utilizing an acceptable retrieval system when an entrant cannot perform self-removal. Determining the appropriate means for rescuing entrants safely shall be part of the planning process for every permit space entry. All rescue plans and operations must be documented on a Caerus Safe Work Permit.

Factors that may make non-entry rescue impractical include:

- An entrant may become trapped or entangled because of the internal configuration of the space;
- The use of non-entry rescue equipment (body harness or wristlets and lifeline) is impractical;
- The entrance into the space is elevated or positioned so that non-entry rescue would be inhibited;
- The permit space is entered vertically and a mechanical retrieval device cannot be utilized or may be ineffective;
- Employees attending the entrants' lifelines are not physically capable of removing entrants from the confined space.

When non-entry rescue is not practical, a trained and qualified rescue service must be provided onsite while the entry is taking place.

5.3.2 RETRIEVAL SYSTEMS

The use of a retrieval system enables the rescue of the entrants from outside of the space in the event self-removal is not possible. Whenever an authorized entrant enters a permit space, a retrieval system or methods will be used, unless the retrieval equipment increases the overall risk of entry or would not contribute to the rescue. Retrieval systems must be documented on a Caerus Safe Work Permit.

Retrieval systems should meet the following requirements:

- Each authorized entrant will use a chest or 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 if it is impractical to use a chest or full body harness.
- The other end of the retrieval line will be attached to a mechanical device or fixed point outside of the permit 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 Employees from vertical type permit spaces more than 5 feet deep (such as a storage tank or vessel with no side entrance). Mechanical retrieval devices must be approved for rescue use.

5.3.3 RESCUE SERVICES

When the use of a retrieval system is not possible or would not be effective, and other non-entry rescue methods are not available or are ineffective, then a qualified rescue service (two or more persons properly trained & equipped) will be present and able to enter the space immediately. Rescue services must be documented on a Caerus Safe Work Permit.

The attendant is responsible for summoning the rescue service. The rescue service is responsible for entering the permit space in order to retrieve the entrants. The rescue service may or may not be Caerus Employees.

During the rescue, at least one person must be designated to remain outside of the confined space and at least one person participating in the rescue will have a valid (current) first aid/CPR certification. The attendant can perform entry rescue ONLY when trained as a rescuer and relieved by another attendant.

MSDSs must be made available to the medical facility providing treatment to entrants injured and/or exposed to a substance for which Caerus is required to maintain an MSDS. If the chemical is owned by another company, obtain an MSDS from them and send it to the hospital with the injured worker.

If non-Caerus Employees provide rescue services, they will be informed of the hazards present where rescue may be required, and they will be afforded access to all permit spaces from which rescue may be necessary for the purpose of training and preplanning rescue procedures

5.4 ENTRY PERMIT

5.4.1 PERMIT ISSUANCE

Whenever a permit required confined space is to be entered, a Confined Space Entry Permit (Sec. 5.4.4) AND a Safe Work Permit must be completed and signed by the Entry Supervisor and Permit Issuer prior to entry. In some cases, the same individual may serve both roles.

The Safe Work Permit is both an authorization for and a record of the confined space entry. The permit must be posted at the confined space entrance (entry point) until the job is completed. All cancelled Safe Work Permits for confined space entries shall be maintained at the Caerus Corporate Office.

When Hot Work is to be performed inside of a permit required confined space, the Hot Work must be addressed on the Safe Work Permit.

5.4.2 PERMIT CONTENT

INFORMATION FOR A SAFE WORK PERMIT

Each section of the Safe Work Permit used for a confined space entry shall be properly completed with ALL required information and necessary approvals prior to starting the job. The Safe Work Permit contains the following sections:

- Work Request
- Hazard Identification
- Work Preparation
- Required Personal Protective Equipment (PPE)
- Emergency Preparedness
- Atmospheric Monitoring
- Excavations
- Additional Permit Conditions
- Isolation Verification
- Worker Briefing
- Confined Space Entry
- Permit Authorization/Validation
- Permit Cancellation / Post Entry Review

INFORMATION FOR A CONFINED SPACE ENTRY PERMIT

Minimum information requirements for a Confined Space Entry Permit (Sec 5.4.4):

- 1) The identity and location of the space;
- 2) The purpose of the entry;
- 3) The date and authorized duration;

- 4) Names of authorized entrants;
- 5) Names of attendants utilized;
- 6) Signature of the permit issuer and signatures of any subsequent entry supervisors.
- 7) Hazards of the confined space;
- 8) Measures used to isolate and to eliminate or control the hazards before entry.
- 9) Acceptable entry conditions;
- 10) Results of all required monitoring, the initials of the testers and the times the tests were taken;
- 11) The information necessary for summoning rescue and emergency services (name, telephone number, etc.);
- 12) The means of communication to be used between entrants and attendants.
- 13) List of required equipment for the entry;
- 14) All other relevant information;
- 15) Any additional permits issued relative to the entry.

Each section of BOTH permits must be fully completed, although it is permissible to refer to the other document for any duplicate information.

5.4.3 PERMIT CANCELLATION

The Entry Permit will be cancelled under the following conditions:

- Upon completion of the job;
- At the expiration of the authorized time period; or
- Upon the occurrence of any condition that may present a hazard or unsafe condition not specifically addressed by the permit.

Entry Permits are only valid for one work shift. The Entry Permit must be cancelled at shift change and a new Entry Permit will be issued.

It shall be the responsibility of the Permit Issuer to cancel the entry permit. Upon cancellation of a permit, the permitted confined space will not be reentered until it has been re-tested and a new permit is issued. Any occurrence of a non-authorized condition (unsafe condition or hazard) shall be noted on the permit at the time of cancellation. This information shall be used to facilitate review of entry procedures established under this program.

Post entry communications between the Employees involved in the confined space entry task and the persons responsible for the planning of the confined space entry will occur, to ensure that any deficiencies or hazards confronted during the entry are noted and addressed.

Communications, hazards, recommendations, etc. should be documented on the permit form.

5.4.4 CONFINED SPACE ENTRY PERMIT

NOTE: This is a 4-page permit.

Permit must have all items completed. Permit is valid for 8 hours only.
Permit must remain at job site until job is completed.

Date and Time Issued: _____ Date and Time Expires: _____

Job site/Space I.D.: _____ Job Supervisor: _____

Equipment to be worked on: _____

Work to be performed: _____

Stand-by Employees: _____

Atmospheric Checks Before Ventilation:

Time _____

Oxygen _____ %

Explosive _____ % L.F.L.

Toxic _____ PPM

NORM _____ μ R/hr

Tester's signature: _____

(Continued)

Source Isolation Procedures:

REQUIREMENTS COMPLETED	DATE	TIME
Lock Out/De-energize/Try-out		
Line(s) Broken-Capped-Blanked		
Purge-Flush and Vent		
Ventilation		
Secure Area (Post and Flag)		
Breathing Apparatus		
Resuscitator - Inhalator		
Standby Safety Employees		
Full Body Harness with "D" ring		
Emergency Escape Retrieval Equipment		
Lifelines		
Fire Extinguishers		
Lighting (Explosive Proof)		
Protective Clothing		
Respirator(s)		
Burning and Welding Permit		
Note: For items that do not apply enter N/A in the blank.		

Ventilation Modification (Check one):	N/A	Yes	No
Mechanical	()	()	()
Natural Ventilation only	()	()	()

****RECORD CONTINUOUS MONITORING RESULTS EVERY 2 HOURS**

Oxygen Percentage: 19.5% to 23.5% _____

Carbon Monoxide: +35 PPM _____

Aromatic Hydrocarbon: + 1 PPM * 5PPM _____ Lower

Flammable Limit: Under 10% _____ Hydrogen

Sulfide: +10 PPM *15PPM _____ Sulfur

Dioxide: + 2 PPM * 5PPM _____ Ammonia:

*35PPM _____

- * Short-term exposure limit: Employee can work in the area up to 15 minutes.
- + 8 hr. Time Weighted Avg.: Employee can work in area 8 hrs (longer with appropriate respiratory protection).

Remarks:

Gas Tester Name _____ Check # _____

Instruments Used _____ Model _____

&/or Type _____ Serial # _____

or Unit # _____

Communication procedures: _____

Rescue procedures: _____

A Standby Person (Attendant) is required for all Confined Space work.

Entry, standby, and back up persons:	Y	N
Successfully completed required training?	Y	N
Is training current?	Y	N

Safety Standby Person _____

Confined Space Entrants _____

Equipment:	N/A	Yes	No
Direct reading gas monitor – tested	()	()	()
Safety harnesses and lifelines for entry and standby persons	()	()	()
Hoisting equipment	()	()	()
Powered communications	()	()	()
SCBAs for entry and standby persons	()	()	()
Protective Clothing	()	()	()
All electric equipment listed, Class I, Division I, Group D and Non-sparking tools	()	()	()

We have reviewed the work authorized by this permit and the information contained within. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Field Supervisor) _____ Approved

By: (Unit Supervisor) _____

Reviewed By: _____
(printed name)

(signature)

Permit must be kept at job site until work is complete.

Return job site copy to Caerus Corporate Office following job completion. Be sure that it is signed and dated.

5.5 PROGRAM REVIEW

A review of the Confined Space Entry Program and entry operations will be performed as follows:

- By a qualified person when there is reason to believe that the measures taken under this program may not protect Employees and the procedures must be revised to correct deficiencies found before subsequent entries are authorized;
- On an annual basis or more frequently if necessary, by health and safety Employees using cancelled permits, alternate entry procedure certifications and other associated documentation, to ensure that entrants are protected from permit space hazards; and
- Periodically, by affected Supervisors, to evaluate confined space entry procedures and review cancelled entry permits and associated documentation to ensure that correct entry procedures are being followed and Employees are protected from permit space hazards.

Periodic supervisory reviews and annual health and safety reviews shall be documented in the audit section of the Safe Work Permit used for a permit-required confined space entry or Alternate Entry Procedure Certification that is reviewed.

Inadequacies in confined space entry procedures shall be brought to the attention of the appropriate Supervisor and corrective actions shall be taken immediately to correct program deficiencies and ensure the safety of Employees entering confined spaces.

5.6 ALTERNATE ENTRY PROCEDURES

5.6.1 APPLICATION

In rare instances, there may be permit-required confined spaces where the ONLY hazard is an actual or potential hazardous atmosphere. In these instances, “Alternate Entry Procedures” may be appropriate and can be utilized in lieu of the standard permit-required confined space entry procedures previously discussed.

NOTE: Alternate procedures may ONLY be used in rare cases where ALL the requirements discussed below are met. Consult with a Supervisor prior to using Alternate Entry Procedures.

5.6.2 REQUIREMENTS

Alternate Entry Procedures may be utilized entering a permit-required confined space where:

- The ONLY hazard posed by the confined space is an actual or potential hazardous atmosphere;
- The work to be performed will not create any hazards to entrants inside or outside the space while the entry is in progress; and
- By the use of continuous forced air ventilation, the hazardous atmosphere can be eliminated and maintained at levels safe for entry without the use of respiratory protection.

Note: Initial atmospheric monitoring of the space must be conducted with the ventilation supply turned off.

5.6.3 ALTERNATE ENTRY PROCEDURES

The following requirements will be observed when entry into a permit required confined space is undertaken using “alternate entry procedures.”

All hazardous energy sources must be properly isolated and lockout/tagout applied in accordance with the Caerus Lockout/Tagout Program.

Conditions making it unsafe to remove an entrance cover must be eliminated prior to the cover being removed. When entrance covers are removed, the openings must be promptly guarded to prevent accidental falls, the entry of unauthorized Employees, and/or foreign objects through the opening.

The internal atmosphere must be tested with a calibrated direct reading instrument for the following conditions and in the order listed:

- Oxygen content
- Combustible gases and vapors
- Toxic air contaminants

NOTE: If it is necessary to enter the space to take these measurements, or evaluate hazards, then procedures established for permit-required confined space entry will be adhered to. There must NEVER be a hazardous atmosphere or a hazardous condition (which can cause death or physical harm) within the space whenever any person is to enter the confined space under alternate procedures.

5.6.4 VENTILATION

Continuous forced air ventilation shall be used as follows:

- Employees may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;
- The forced air ventilation will be so directed as to ventilate the immediate areas where the Employees is or will be present within the space and will continue until all Employees have left the space;
- The air supply will be from a clean source and may not increase the hazards in the space.

5.6.5 ATMOSPHERIC MONITORING

Prior to entry, forced air ventilation shall be suspended for a minimum of 15 minutes prior to conducting atmospheric monitoring of the space. Acceptable entry conditions must be observed or entry under alternate procedures is not permitted.

Prior to entry, verification that the space is safe for entry and that all the measures required above have been taken will be certified through a written and approved Alternate Entry Procedure Certification Form that contains:

- The date and time;
- Location of the space;
- The name of the space to be entered;
- A description of the work to be performed;
- Verification that the space meets ALL required conditions for entry;
- Documentation that atmospheric testing has been performed and that continuous forced air ventilation alone is sufficient to maintain an acceptable atmosphere;
- Documentation that no other hazards exist within the space; and
- Signature of the Entry Supervisor making the certification.

The certification will be made before entry and will be available to each person entering the space.

The atmosphere within the space will be periodically or continuously monitored to ensure that continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

Conditions inside and around the space will be continually evaluated for any hazardous condition.

If a hazardous atmosphere or hazardous condition is detected during entry:

Caerus Oil and Gas, LLC
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- Each Employee will leave the space immediately;
- The space will be evaluated to determine how the hazardous atmosphere or hazardous condition developed;
- Measures will be taken to protect the entrants from the hazards and to prevent recurrence, before any subsequent entry takes place.

5.7 ALTERNATE ENTRY PROCEDURES CERTIFICATION FORM (Page 1 of 3)

Alternate Entry Procedures may be utilized in rare cases where the ONLY hazard in a permit-required confined space is an existing or potential atmospheric hazard. This Checklist and Certification must be completed and meet required conditions for an entry to take place. All other confined space entries shall be made utilizing the Safe Work Permit and Permit-Required Confined Space Entry Procedures.

NOTE: If you answer “Yes” to any of the following questions, an Alternate Entry is not allowed. A standard Confined Space Entry Permit must be completed.

Does the space contain any potential hazardous energy sources that have not been properly isolated and lockout/tagout applied in accordance with Caerus policies?

Does the space contain ANY SERIOUS HAZARDS other than an existing or potential atmospheric hazard? (Refer to list of hazards on Safe Work Permit)

Does the space contain a material that has the potential for engulfing the entrant?

Does the space have an internal configuration such that the entrant could become trapped or asphyxiated? (i.e.; inward converging walls, floor that slopes downward tapering floor, piping or obstacles that could cause entrapment, etc.)

Does the space contain any other recognized serious safety or health hazard?
(i.e.; hazardous chemicals, moving equipment, NORM contaminated material, fall danger, temperatures extremes, etc.)

Will the work being performed create any hazards (inside or outside the space) which the entrants will be exposed?

ALTERNATE ENTRY PROCEDURES CERTIFICATION FORM (Page 2 of 3)

Are there any conditions that may make it unsafe to open the cover leading into the space that cannot be eliminated?

Will entry into space be necessary to obtain atmospheric monitoring results and inspect the space for additional hazards?

Are protective measures in place to protect Employees from falling into the space and protect Employees inside the space from foreign objects entering the space?

Is atmospheric monitoring equipment available onsite for conducting atmospheric monitoring? (i.e.; oxygen, LEL, H₂S, NORM)

Can continuous forced air ventilation maintain the space safe for entry?

Is ventilation equipment available onsite and ready for use during alternate entry procedures?

Will continuous forced air ventilation be utilized during the entry?

Can continuous forced air ventilation be directed to ventilate the immediate areas the Employees will be present in the space?

Will the atmosphere within the space be continuously monitored to ensure that a hazardous atmosphere does not develop?

ALTERNATE ENTRY PROCEDURES CERTIFICATION FORM (Page 3 of 3)

INITIAL ATMOSPHERIC MONITORING RESULTS (No Forced Air Ventilation or Ventilation Shut Off for a Minimum of 15 Minutes)							
Time	Oxygen (19.5–23.5%)	LEL (<10%)	H2S (<10ppm)	()	()	Initials	Comments
ATMOSPHERIC MONITORING RESULTS (Continuous Monitoring Results With Ventilation Operating)							
Time	Oxygen (19.5–23.5%)	LEL (<10%)	H2S (<10ppm)	()	()	Initials	Comments
NOTE: If hazards are encountered or the above acceptable atmospheric conditions are not met, then the space MUST be evacuated and a Safe Work Permit and Permit-Required Confined Space Entry Procedures shall be utilized.							
I certify that I have prepared this work in accordance with Caerus ' Alternate Entry Procedures and certify that the space meets all requirements listed above and that the atmosphere within the space has been monitored and conditions are acceptable for Employees entry. I acknowledge that this certification shall be voided if any unsafe conditions arise and subsequent entry will be performed using a Safe Work Permit and Caerus ' Permit-Required Confined Space Entry procedures. I further agree to post this certification at the entry site for Employee review.							
Signed: _____							
Time: _____ Date: _____							
Entry Supervisor: _____							

CAERUS OIL AND GAS, LLC HEALTH & SAFETY PLAN

Driving Safety Program

**Prepared
April 2016 By:**



**Caerus Oil and Gas, LLC
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1.0 DRIVING SAFETY

According to the National Institute of Occupation Safety and Health (NIOSH), motor vehicle crashes are the leading cause of work-related fatalities. Employees are more likely to be injured from traffic-related motor vehicle crashes than from any other hazard on the job. Caerus Oil and Gas, LLC (Caerus) will attempt to reduce driving risks by promoting safe driving habits in Employees who operate motor vehicles.

1.1 PURPOSE

The purpose of this Driving Safety Program is to promote safe driving in Employees operating motor vehicles in order to prevent accidents and Employee injury or death.

1.2 SCOPE

This Driving Safety Program applies to all Caerus Employees who operate a company owned vehicle or a private vehicle used on company business.

2.0 RESPONSIBILITIES

2.1 EMPLOYEE RESPONSIBILITIES

- Be knowledgeable of the provisions of this Driving Safety Program and participates in training when requested;
- Understand the high incidence of work-related vehicle accidents and fatalities;
- Practice safe driving and defensive driving techniques at all times;
- Have a valid driver's license while operating any motor vehicle on company business;
- Inform the appropriate supervisor or manager of any hazards that they feel are not adequately addressed in this Driving Safety Program;
- Report all near misses and incidents to Caerus Management;
- Correct observed unsafe acts and report unsafe conditions.

2.2 FIELD SUPERVISORS AND MANAGEMENT RESPONSIBILITIES

- Check the driving records of prospective Employees;
- Implement, support and enforce this Driving Safety Program;
- Maintain, periodically review, and modify the Driving Safety Program as required;
- Maintain training documentation in accordance with the Recordkeeping section of this Driving Safety Program;
- Ensure that Employees understand their responsibilities and comply with requirements of this Driving Safety Program;
- Ensure that Employee training is provided.

2.3 CAERUS CONTRACTOR RESPONSIBILITIES

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local, laws, rules and regulations. Despite operational urgency or importance, work shall not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own driving safety program and examine the related codes and standards applicable to their services. At a minimum contractors should:

- Comply with all applicable Federal, State, and local, laws, rules and regulations;
- Check the driving records of prospective Employees;
- Report all near misses and incidents to Caerus Management;
- Correct observed unsafe acts and report unsafe conditions;
- Document training of Employees and keep records of training;
- Should any doubt arise as to the meaning or interpretation of Contractor Responsibilities, the Contractor should consult with the Caerus Management.

3.0 TRAINING

The best way to become a safe driver is to practice safe driving techniques until they become a habit. To help Caerus Employees remain safe drivers, driver training will be provided periodically to all Employees who drive on company business.

Training topics shall include:

- The required use of seat belts;
- Requirements to obey traffic regulations;
- Restrictions on drugs and alcohol;
- Proper following distances;
- Maintaining escape routes;
- Not trusting other drivers to behave as expected;
- Controlling vehicle speed;
- Use of lights and turn signals;
- Avoiding distractions;
- Driver fatigue;
- Pulling trailers;
- Driving in bad weather conditions.

4.0 SAFE DRIVING PRACTICES

Unlike other workplaces, the roadway is not a closed environment. Preventing work-related roadway crashes requires strategies that combine traffic safety principles and sound safety management practices. Although Caerus cannot control roadway conditions, safe driving behavior can be promoted by providing safety information to workers and by setting and enforcing driver safety policies. Vehicle crashes should not be considered an unavoidable part of doing business.

The following practices will be followed by Caerus Employees while using a company-owned vehicle or using a private vehicle on company business.

- All drivers must have a valid driver's license.
- All drivers must carry a valid insurance policy on their vehicles.
- The driver and all occupants must wear safety belts at all times.
- Vehicle capacity is limited to the number of safety belts available inside the vehicle.
- Drivers shall abide by all applicable traffic regulations, including speed limits, stop signs and yield signs, stopping at all red lights, etc.
- Drivers shall not operate the vehicle if they are under the influence of drugs or alcohol (this includes prescription drugs that may impair their driving ability).
- Employees shall not ride in the bed of any truck.
- Drivers shall take a look around the entire vehicle for hazards before entering, starting, and driving the vehicle.
- Drivers shall not leave a vehicle unattended with the motor running. Doing so not only increases the chances of theft, but is also in violation of air quality standards in many areas.

5.0 DEFENSIVE DRIVING TECHNIQUES

According to National Safety Council data, 77 percent of all accidents are attributed to driver error. Defensive driving is a technique to reduce the risk of driving by anticipating dangerous situations, despite adverse conditions or the mistakes of others. If you become a good defensive driver, you can cut your risk of an accident significantly.

Here are some important elements of defensive driving:

5.1 BEFORE YOU DRIVE

- Check tire pressure, tread, and general condition regularly. Low tire pressure can cause tires to explode at high speeds.
- Check, and clean if necessary, all windows and mirrors. Clean the inside of the windows as well as the outside.
- Check oil, gas, and water levels before taking long trips.
- Check that mirrors, seat, and steering column are suitably positioned.
- Check gauges after starting the engine. Trust your equipment. If your “oil” light is on, assume that your car needs oil, not that there is a short in the wiring to the oil light.
- Secure all loose objects inside the vehicle or move them into the trunk. Loose debris/items in the car can become airborne during a collision and severely injure occupants.
- Make a visual circle check of vehicle before driving away. In congested areas, try to park where backing is not required.
- Indicate with turn signal and check for traffic before moving away from the road shoulder.
- Be prepared for variable traffic and weather conditions.
- Know if the car has antilock brakes or not, and how you should respond to braking on difficult surfaces.
- Keep all car documents updated and reachable.

5.2 SEE AND BE SEEN

- Always take the long view and be aware of what is happening far down the road.
- Use headlights at all times, even during the day.
- Keep windows clean, especially when driving at night.
- Keep windows clear and transparent. Avoid dark tinting, stick-on toys, light shades, dangling fuzzy dice, etc.
- Adjust the rear-view mirrors correctly and often.
- Keep your distance when driving behind large vehicles, to keep your line of sight clear.
- Do not drive in the blind spot of other vehicles. If another vehicle is traveling in your blind spot, adjust your speed so that they aren't.
- Always use your turn signals well in advance when making a turn or lane change.

- Activate your hazard warning lights on approach to a crash scene or unexpected on-road obstruction, to alert other traffic of the hazard.
- Actively search and anticipate the movements of pedestrians, bicycles, motorcycles, and animals in the area.
- Be aware of all signs that warn you of dangers ahead, objects on the road, and potholes.
- Drive so that you can safely stop in the visible amount of road ahead, using at least the two-second rule and preferably more. Anything can be around the next corner.
- Pay attention to the vehicle two vehicles ahead of you. This will help you predict the movement or braking of the vehicle immediately ahead of you to give you more reaction time.
- Beware of blind intersections. If your view of traffic on cross streets is obstructed by buildings or trees, take your foot off the gas and place it over the brake to reduce your reaction time.

5.3 ASSUME THE WORST IN OTHERS

- Expect that a vehicle with a turn signal on will not turn.
- Similarly, expect a vehicle with no turn signal to turn suddenly.
- Assume that stop signals will be ignored by others and be prepared for it.
- Expect that a red traffic light will be "run" (don't take off too quickly on your green light).
- Beware of a stale green light. Expect it to turn yellow as you approach.
- Assume that any and all other drivers have NOT seen your vehicle.
- Assume that any and all other drivers are not capable of preventing an accident.
- At intersections never assume that you have the Right Of Way (even if you legally do).
- Watch for drivers talking on cell phones while driving and be aware that their driving skills are severely diminished, possibly even worse than a drunk driver. They often drive through stop signs and traffic signals, change lanes without warning, and remain totally unaware of their poor driving habits.

5.4 MAINTAIN AN EXIT ROUTE

- Keep the space on either side of your car free. Leave yourself an out if something happens unexpectedly.
- Drive in the outer lane on freeways. In case of a problem, you won't have to cross a lane of traffic to get to the breakdown lane.
- Keep wheels straight when waiting to turn across oncoming traffic. If your car is rear-ended, it won't be pushed into the opposite lane.

5.5 AVOID DANGER

- Be courteous to other drivers.
- Avoid road rage. Don't drive while angry or upset.

- Realize that in many cases, people who are already angry or upset “go for a drive”. If you encounter an enraged driver, do not retaliate and make the situation worse.
- If tailgated, change lanes or pull over. If that is not possible, slow down and/or maintain extra distance from the car in front of you, to allow for both yourself and the tailgater to stop safely.
- Maintain a two to three second following distance behind other vehicles. Increase that to five seconds in fog, rain, or other adverse conditions. It takes most people at least half a second to react to an emergency condition. Following a car closer than one second effectively guarantees an accident if the leading car brakes unexpectedly.
- Avoid visibly damaged or defective cars. A history of accidents indicates that the owner has poor driving skills.
- Avoid cars that weave, do not stay in lane, or brake too late at intersections, as their drivers may be intoxicated or distracted.
- Do not drive next to large vehicles longer than necessary. The driver may not see you, and a turning truck can suddenly cut off all exit routes.
- Never drive over any object on the road that can be safely avoided. A plastic bag can conceal more dangerous items, ropes can wrap around axles, and even mundane objects like sticks can puncture a tire or the fuel tank.
- On roads of three or more lanes, take care not to change lanes as another vehicle in the next lane over moves into that lane. Vehicles in the left lane and the right lane can collide if they try to change to the center lane simultaneously.
- Remember that 95% of fatal collisions on an undivided four lane highway occur in the inside lane and that you can avoid this danger by simply driving in the outside lane.
- Always Stop, Look and Listen at railroad crossings with no lighted signal. At crossings that have signals, slow down and make sure your visual distance of the track is adequate, in case the signal is not working properly.

5.6 CRASH AND VEHICLE BREAK-DOWN SCENES

- Approach a broken-down vehicles or crash scenes with caution, but do not be distracted by them. Watch for pedestrians and wandering animals at the scene.
- If your vehicle develops engine trouble and begins to slow, move to the side of the road as far as possible from traffic. If your vehicle breaks down on the road in an exposed position:
 - 1) Activate your hazard warning lights immediately.
 - 2) Have passengers leave the vehicle if and when it is safe to do so, and keep them well clear of traffic.
 - 3) Carefully place a flare or hazard warning triangle to the side of the road, or side of an affected traffic lane to alert approaching vehicles of potential danger. When walking to place the triangle, hold it in front of you to alert drivers to the hazard. Hold it behind you when you collect it and return to your vehicle.
- Avoid working on the traffic side of your vehicle.
- Watch carefully all approaching traffic for potential loss of vehicular control.

6.0 VEHICLE MAINTANENCE

A key part of safe driving is vehicle maintenance. Caerus Employees shall not operate a vehicle with defective or substandard brake systems, tires, lights, horns, steering, or damaged suspension parts.

Caerus Employees shall follow the following vehicle safety procedures:

- Maintain your vehicle. Repair defective or damaged vehicle parts as soon as possible.
- Be sure that windshield wipers are in good working order. Windshield wipers are inexpensive, and should be replaced on a regular basis. Poor wipers can be extremely dangerous during rain and snow storms.
- Clean the inside of your windshield as well as the outside. Many accidents are caused by poor visibility due to a dirty windshield.
- Keep your windshield washer fluid reservoir full. You can use a lot of fluid on days with lots of splash-back.
- Check your tires regularly for tread wear.
- If you tow a trailer, be sure that you have the correct size and type of trailer hitch and use your safety chains.
- Any damage caused while a company vehicle is in motion constitutes a vehicle accident and must be reported to a Caerus supervisor or manager.

7.0 VEHICLE ACCIDENT REPORTING

Employees involved in a vehicle accident while on company business should adhere to the following accident reporting guidelines described below.

- 1) Follow local and/or state laws with respect to reporting accidents to police.
- 2) Cooperate with police officers investigating the accident.
- 3) Vehicle accidents that involve another vehicle, that cause personal injury, or third party property damage should be reported by phone to the appropriate supervisor or manager immediately.
- 4) All other vehicle accidents should be reported to the appropriate supervisor or manager within eight hours.
- 5) The company driver shall obtain personal and insurance information from the other driver and, if available, obtain names and addresses of witnesses, police reports, and any other related information.
- 6) The company driver should exchange only the necessary information with the other driver, (i.e. names, drivers license, insurance) and **SHOULD NOT** make commitments or express responsibility for the accident. State that you will report it to your company; any liability will be determined by the company and their insurance carrier. Do not assume or place any blame or responsibility. Do not express opinions or become involved in arguments.

Employees in jobs that require driving on company business should recognize that their jobs may be at risk in a case of:

- Excessive traffic violations;
- Violations involving alcohol or drugs;
- Having their license suspended, revoked or canceled;
- Violations of other company guidelines while driving on company business.

CAERUS OIL AND GAS, LLC

HEALTH & SAFETY PLAN

Elevated Work Surfaces and Fall Protection Program

**Prepared
April 2016 By:**



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1.0 ELEVATED WORK SURFACES AND FALL PROTECTION

The Elevated Work Surfaces and Fall Protection Program is prepared for use by Caerus Oil and Gas, LLC (Caerus) to ensure that fall hazards are assessed and that Employees are protected from injury. It will ensure that the proper precautions are taken while working on or from ladders, fixed industrial stairs, unguarded edges, floor openings, etc.

1.1 PURPOSE

The program is written to comply with the following standards in the Code of Federal Regulations (CFR).

- 29 CFR Part 1910.21 thru .29 Subpart D – Walking / Working Surfaces
- 29 CFR Part 1915.159 – Personal Fall Arrest Systems
- 29 CFR Part 1926.500 thru .503 Subpart M – Fall Protection
- OSHA Fall Protection Information Sheet
- American National Standards Institute (ANSI) Standard Z359.1-1992 – Safety Belts, Harnesses, Lanyards, Lifelines & Drop Lines for Construction and Industry

1.2 SCOPE

This program establishes application and performance criteria for personal fall arrest systems which are applicable to all Caerus Employees. A personal fall arrest system means a system used to arrest an Employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. According to OSHA, a fall arrest system is required if risk exists that a worker may fall from an elevated position. As a general rule, the fall arrest system should be utilized anytime a working height of six feet or more is reached. Before using personal fall arrest equipment, each affected Employee should be properly trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off techniques. Personal fall arrest systems should be inspected prior to each use. This program also includes safety requirements for stairs and elevated work surfaces as well as ladders.

1.3 DEFINITIONS

Because this program uses terminology specific to Elevated Work Surfaces and Fall Protection, the following definitions will be used:

Anchor Point – Refers to a secure point of attachment for lifelines, lanyards, or deceleration devices.

Body Harness – Straps that will secure about the worker in a manner that will distribute the force of a fall over at least the thighs, pelvis, waist, chest and shoulders, with the means for attaching it to other components of a personal fall arrest system.

Connector – A device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together.

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 an Employee's harness attachment point at the moment of activation (at the onset of fall arrest forces) of deceleration device during a fall, and the location of that point of attachment after the Employee comes to a complete stop.

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

Extension Ladder – A non-self-supporting portable ladder consisting of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the two sections.

Free Fall – The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free Fall Distance – The vertical displacement of the fall arrest attachment point on the Employee's harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Guardrail – A barrier capable of withstanding a load of at least 200 pounds in any direction erected to prevent workers from falling to a lower level.

Handrail – A single bar or pipe supported by brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.

Lanyard – A flexible line of rope, wire rope, or strap which generally has a connector at each end for attaching to the body harness and the deceleration device, or anchor point.

Lifeline – A component consisting of a flexible line for connection to an anchorage point at one end to hang vertically (vertical lifeline), or for connection to anchorage points 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.

Locking Type Snap-Hook – A connector consisting of a hook-shaped member with a self-closing, self-locking keeper which remains closed and locked until it is unlocked and pressed open for connection or disconnection. This is sometimes referred to as a double locking snap-hook.

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 Employees can fall to a lower level.

Personal Fall Arrest System – A system used to arrest a worker in a fall from a working level. It consists of an anchorage point, connectors, body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these.

Qualified Person – A person who, by training and/or experience, is knowledgeable with the construction and operation of the equipment and hazards involved, and is knowledgeable with the requirements of this standard.

Rail – The side members of a ladder joined at intervals by either rungs or steps.

Rise – The vertical distance from the top of a tread to the next higher tread.

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

Self-Retracting Lifeline or Lanyard – A deceleration device containing a drum-wound line that can be slowly extracted from, or retracted on to, the drum under slight tension during normal worker movement, and which, after the onset of a fall, automatically locks the drum and arrests the fall.

Single Ladder – A non-self-supporting, portable ladder, nonadjustable in length, consisting of one section. The length of its side rail determines its length.

Toeboard – A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for Employees.

Tread Width – The horizontal distance from the front to the back of a tread, including nosing, when used.

Walking/Working Surface – Includes any surface, whether horizontal or vertical, on which an Employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, form-work and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which workers must be located in order to perform their job duties.

Work Area - The portion of a walking/working surface where job duties are being performed.

2.0 RESPONSIBILITIES

2.1 EMPLOYEE RESPONSIBILITIES

- Comply with the contents of the Fall Protection Program;
- Recognize fall hazards and use fall protection when at heights of six feet or greater;
- Discuss any uncertainties about identification of a fall hazard with a Caerus Supervisor;
- Being knowledgeable of the provisions of this program and participating in training when requested;
- Prior to using a personal fall arrest system inspect the equipment for mildew, wear, damage and other deterioration;
- Remove defective components from service if their strength or function may be adversely affected;
- Notify supervisors of any personal fall arrest systems that have been subject to impact loading and remove them from service.

2.2 FIELD SUPERVISOR AND MANAGAMENT RESPONSIBILTIES

- Caerus should fully evaluate the work conditions and environment (including seasonal weather changes) before selecting the appropriate personal fall arrest system;
- Before purchasing or putting into use a personal fall arrest system, Caerus should obtain supplier information about the system based on its performance during testing so that Caerus can know if the system meets the OSHA standards;
- Caerus should also obtain comprehensive instructions from the supplier as to the system's proper use and application;
- Provide Employees with information and training on fall protection in their work area at the time of their initial assignment, and whenever a new physical or health hazard the Employees have not previously been trained about is introduced to their work area and ensure the training is documented;
- Determine the strength and integrity of anchor points;
- Ensure that inspections of fall protection equipment are performed and any deficiencies addressed and corrected;
- Remove from service personal fall arrest systems that have been subject to impact loading;
- Inspect ladders and document them with ladder tags;
- Implement, support and enforce the Fall Protection Program and periodically review and evaluate its overall effectiveness.

2.3 CONTRACTOR RESPONSIBILITIES

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local laws, rules and regulations. Despite operational urgency or importance, work shall not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own safety program and examine the related codes and standards applicable to their services. At a minimum contractors should:

- Provide Employees with information and training on fall protection in their work area at the time of their initial assignment, and whenever a new physical or health hazard the Employees have not previously been trained about is introduced to their work area and ensure the training is documented;
- Ensure that inspections of fall protection equipment are performed and any deficiencies addressed and corrected;
- Remove from service personal fall arrest systems that have been subject to impact loading;
- Inspect ladders and document them with ladder tags;
- Implement, support and enforce a Fall Protection Program;
- Report all Near Misses and Incidents to Caerus management.
- Comply with all applicable Federal, State, and local laws, rules and regulations;
- Should any doubt arise as to the meaning or interpretation of Contractor Responsibilities, the Contractor should consult with the Caerus Management.

3.0 TRAINING

Before using personal fall arrest equipment, each affected Employee should be properly trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off techniques. Affected Employees should also be trained so that they can demonstrate proper use, inspection, and storage of their equipment.

1. Training will be provided at the time of the Employee's initial assignment.
2. Training will be provided when there is a change in potential hazards.
3. Retraining will be provided whenever a periodic inspection reveals that there are inadequacies in the Employees' knowledge or use of these procedures.
4. Employees will be retrained periodically (on an annual basis at a minimum) so that they are familiar with the Elevated Work Surfaces and Fall Protection Program.
5. The Caerus Corporate Office will maintain training records. The records will contain each Employee's name and the dates of training. Training records will be kept for at least three years after the Employee leaves Caerus.
6. Training should include:
 - Application limits;
 - Proper anchoring and tie-off techniques;
 - Estimation of free fall distance;
 - Determination of deceleration distance;
 - Total fall distance to prevent striking a lower level;
 - Methods of use;
 - Inspection and storage of the system.

4.0 FALL PROTECTION

4.1 SELECTION OF FALL PROTECTION

Caerus should fully evaluate the work conditions and environment (including seasonal weather changes) before selecting the appropriate personal fall arrest system. Before purchasing or putting into use a personal fall arrest system, Caerus should obtain supplier information about the system based on its performance during testing so that Caerus can know if the system meets the OSHA standards. Caerus should also obtain comprehensive instructions from the supplier as to the system's proper use and application.

4.2 SYSTEM PERFORMANCE CRITERIA FOR PERSONAL FALL ARREST SYSTEMS

- Personal fall arrest systems should, when stopping a fall:
 - Limit maximum arresting force on an Employee to 1,800 pounds when using a body harness
 - Bring an Employee to a complete stop and limit maximum deceleration distance an Employee travels to 3.5 feet
 - They should not allow an Employee to free fall more than 6 feet nor contact any other level
- All fall protection equipment including lanyards, vertical lifelines, and body harnesses shall meet ANSI Standard Z359.1-1992. This number should be imprinted or otherwise permanently attached to the equipment to certify that it meets the minimum requirements of the standard.
- Connectors shall meet ANSI Standard Z359.1-1992. They shall have a corrosion-resistant finish, and all surfaces and edges should be smooth to prevent damage to interfacing parts of the system. They should be made of drop forged or formed steel or be made with materials of equivalent strength.
- D-rings and snap hooks shall have a minimum tensile strength of at least 5,000 pounds. They must be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking or taking permanent deformation.
- Snap-hooks should be a locking type to prevent unintentional disengagement due to rollout of the snap-hook. Non-locking type snap-hooks are prohibited.
- Ropes and straps used in lanyards, lifelines, and strength components of body harnesses shall be made from synthetic fibers or wire rope.
- Anchorage points used for attachment of fall protection components shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per Employee attached to it.
- Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system.

4.3 USE OF FALL PROTECTION

- The attachment point of the body harness should be located in the center of the wearer's back near shoulder level, or above the wearer's head.
- When it is impractical to use a lanyard, a rope grab system can be used on a vertical lifeline.
- When vertical lifelines are used, each worker shall be attached to a separate lifeline.
- Personal fall arrest systems shall not be attached to a guardrail system (e.g., handrails) or to a hoist not acceptable as a suitable anchor point.
- Personal Fall Arrest Systems and components will be used only for fall protection and not to hoist materials.
- Employees using a personal fall arrest system shall practice 100% tie-off (e.g., being protected from falls at all times). This can be achieved by use of a double strap lanyard, a self-retracting lifeline or other approved means.
- Preplanning for retrieval in the event of an emergency should be taken into consideration when developing a proactive fall management plan.
- Knots in lifelines or lanyards can reduce its strength up to 50% and are not permitted.
- Tie-offs where the line passes over or around sharp or rough edges can damage or reduce the strength of a lanyard or lifeline and therefore, must be avoided.

4.4 INSPECTION OF FALL PROTECTION

Personal fall arrest systems should be inspected prior to each use for and any component with significant defect. If a significant defect is identified the system must be withdrawn from service immediately and should be tagged and marked as unusable or destroyed. Personal fall arrest systems or components subject to impact loading should be immediately removed from service and shall not be used again for Employee protection unless inspected and determined by a competent person to be undamaged and suitable for reuse.

Significant defects include:

- mildew or mold
- wear or damage
- cuts, abrasions or tears
- undue stretching
- alterations or additions which might affect its efficiency
- damage due to deterioration
- damage due to contact with fire, acids or other corrosives
- distorted hooks or faulty hook springs
- tongues unfitted to the shoulder of the buckles
- loose or damaged mountings
- non-functioning parts
- wearing of internal deterioration in the ropes

4.4.1 HARNESS INSPECTION

Belts and Rings:

- For harness inspections begin at one end, hold the body side of the belt toward you, grasping the belt with your hands six to eight inches apart. Bend the belt in an inverted "U." Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage. Check D-rings and D-ring metal wear pads for distortion, cracks, breaks, and rough or sharp edges. The D-ring bar should be at a 90 degree angle with the long axis of the belt and should pivot freely.
- Attachments of buckles and D-rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles. Rivets should be tight and unremovable with fingers. Body side rivet base and outside rivets should be flat against the material. Bent rivets will fail under stress.
- Inspect frayed or broken strands. Broken webbing strands generally appear as tufts on the webbing surface. Any broken, cut or burnt stitches will be readily seen.

Tongue Buckle:

- Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Rollers should turn freely on the frame. Check for distortion or sharp edges.

Friction Buckle:

- Inspect the buckle for distortion. The outer bar or center bars must be straight. Pay special attention to corners and attachment points of the center bar.

4.4.2 LANYARD INSPECTION

When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so that the entire circumference is checked. Spliced ends require particular attention. Hardware should be examined under procedures detailed below.

Hardware

Snaps:

- Inspect closely for hook and eye distortion, cracks, corrosion, or pitted surfaces. The keeper or latch should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper rocks must provide the keeper from opening when the keeper closes.

Thimbles:

- The thimble (protective plastic sleeve) must be firmly seated in the eye of the splice, and the splice should have no loose or cut strands. The edges of the thimble should be free of sharp edges, distortion, or cracks.

Lanyards

Steel Lanyards:

- While rotating a steel lanyard, watch for cuts, frayed areas, or unusual wear patterns on the wire. The use of steel lanyards for fall protection without a shock-absorbing device is not recommended.

Web Lanyard:

- While bending webbing over a piece of pipe, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Due to the limited elasticity of the web lanyard, fall protection without the use of a shock absorber is not recommended.

Rope Lanyard:

- Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in period. When a rope lanyard is used for fall protection, a shock-absorbing system should be included.

Shock-Absorbing Packs:

- The outer portion of the shock-absorbing pack should be examined for burn holes and tears. Stitching on areas where the pack is sewn to the D-ring, belt or lanyard should be examined for loose strands, rips and deterioration.

Visual Indication of Damage to Webbing and Rope Lanyards:

- Heat In excessive heat, nylon becomes brittle and has a shriveled brownish appearance. Fibers will break when flexed and should not be used above 180 degrees Fahrenheit.
- Chemical Change in color usually appears as a brownish smear or smudge. Transverse cracks appear when belt is bent over tight. This causes a loss of elasticity in the belt.
- Ultraviolet Rays Do not store webbing and rope lanyards in direct sunlight, because ultraviolet rays can reduce the strength of some material.
- Molten Metal or Flame Webbing and rope strands may be fused together by molten metal or flame. Watch for hard, shiny spots or a hard and brittle feel. Webbing will not support combustion, nylon will.
- Paint and Solvents Paint will penetrate and dry, restricting movements of fibers. Drying agents and solvents in some paints will appear as chemical damage.

4.4.3 CLEANING OF EQUIPMENT

Basic care for fall protection safety equipment will prolong and endure the life of the equipment and contribute toward the performance of its vital safety function. Proper storage and maintenance after use is as important as cleaning the equipment of dirt, corrosives or contaminants. The storage area should be clean, dry and free of exposure to fumes or corrosive elements.

Nylon and Polyester:

- Wipe off all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a

thick lather with a vigorous back and forth motion. Then wipe the belt dry with a clean cloth. Hang freely to dry but away from excessive heat.

Drying:

- Harness, belts and other equipment should be dried thoroughly without exposure to heat, steam or long periods of sunlight.

5.0 STAIRS AND ELEVATED WORK SURFACES

5.1 GUARDRAILS

- Every flight of stairs having four or more risers should be equipped with standard stair railings or standard handrails.
- Every wall opening, open-sided floor or platform 4 feet or more above the adjacent floor or ground level, should be guarded by a standard railing on all open sides except where there is an entrance to a ramp, stairway, or fixed ladder.
- Every runway should be guarded by a standard railing on all open sides 4 feet or more above floor or ground level. Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have a railing on one side omitted where operating conditions necessitate such omissions, provided the falling hazard is minimized by using a runway at least 18 inches wide.
- Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, galvanizing tanks, degreasing units, or similar hazards should be guarded with a railing and toe board.
- A standard railing along elevated walkways should consist of a top rail, intermediate rail, and posts, and should have a vertical height of 42 inches.
- Stair railings and handrails should have a vertical height between 30 and 34 inches.
- Standard railings shall be provided on the open sides of all exposed stairways and stair platforms. Handrails shall be provided on at least one side of closed stairways preferably on the right side descending.
- The anchoring posts and framing of members for railings of all types should be capable of withstanding a load of at least 200 lbs applied at any direction at any point on the top rail.
- A standard toe board should be 4 inches and securely fastened into place.

5.2 FIXED INDUSTRIAL STAIRS

Fixed stairs should be provided for access from one structure level to another where operations necessitate regular travel between levels, and for access to operating platforms at any equipment which requires attention routinely during operations. Fixed stairs shall also be provided where access to elevations is daily or at each shift for such purposes as gauging, inspection, regular maintenance, etc., where such work may expose Employees to acids, caustics, gases, or other harmful substances, or for which purposes the carrying of tools or equipment by hand is normally required. The following requirements apply to fixed stairs.

- Fixed stairways should be designed and constructed to carry a load of five times the normal anticipated load and be able to carry safely a moving concentrated load of 1,000 pounds.
- Fixed stairways should have a minimum width of 22 inches.
- Fixed stairs shall be installed at angles to the horizontal of between 30 degrees and 50 degrees.

- Stairway platforms should be no less than the width of a stairway and a minimum of 30 inches in length measured in the direction of travel.
- Vertical clearance above any stair tread to an overhead obstruction shall be at least 7 feet measured from the leading edge of the tread.
- Where doors or gates open directly onto a stairway, a platform should be provided, and the swing of the door should not reduce the effective width of the platform to less than 20 inches.
- If any component of a stairway (i.e., a step, guardrail, tread, nosing, etc.) is damaged and will prevent safe usage, the top and bottom of the stairway should be blocked off and/or flagged. The stairway should not be used until the problem is fixed.

When ascending or descending a stairway, the following safety precautions should be used:

- Keep one hand on the guardrail/handrail at all times.
- Do not carry anything up or down the stairs that obstructs vision or requires both hands.
- Do not run up or down the stairway.

6.0 LADDERS

6.1 GENERAL LADDER GUIDELINES

- Ladders should be maintained in good condition at all times, the joint between the steps and side rails should be tight, all hardware and fittings securely attached, and the moveable parts should operate freely without binding.
- Ladders should be inspected frequently and those which have developed defects should be withdrawn from service for repair or destruction and tagged and marked as “Dangerous, Do Not Use.”
- The distance between rungs, cleats, and steps should not exceed 12 inches and should be uniform throughout the length of the ladder.
- All single, extension and step ladders shall be made of a nonconductive material such as fiberglass.
- Never exceed the manufacturer’s load capacity rating for the ladder. Refer to the manufacturer’s instructions and information provided on each ladder.
- Tools or other equipment should never be carried by hand, up or down a ladder, but raised or lowered by a rope or carried on a tool belt.
- Always keep both hands on the side rails of the ladder when ascending or descending.
- When ascending or descending, the climber must face the ladder.
- Keep three points of contact with the ladder at all times, either one foot and two hands or two feet and one hand.
- Ladders should be equipped with non-slip bases, feet or cleats when there is a hazard for slipping.
- Ladder rungs or steps should be kept clean and free from oil or grease.

6.2 STEP LADDER

- Steps should be parallel and level when the ladder is in position for use.
- The minimum width between side rails at the top, inside to inside, should not be less than 11 ½ inches. From top to bottom, the side rails should spread at least 1 inch for every foot of length of step ladder.
- A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in open positions should be a component of a stepladder.
- Never progress past the second rung from the top of a stepladder.

6.3 SINGLE OR EXTENSION LADDER

- A simple rule for setting up a single or extension ladder at the proper angle is to place the base a distance from the vertical wall equal to 1/4 the working length of the ladder.
- The ladder should be placed on secure footing.
- The top of the ladder must be placed with the two rails supported, unless equipped with a single support attachment.

- Single ladders longer than 30 feet and extension ladders longer than 60 feet shall not be used.
- When feasible, all single or extension ladders shall be tied-off to prevent movement anytime they are standing upright and shall have secure footing.
- Never progress past the third rung from the top of an extension ladder.
- Extension ladders should extend 3 feet above the point of contact with the equipment or supporting structure when Employees are to climb onto the equipment or structure.
- Extension ladders shall have an overlap between its two sections. This overlap length shall be 1 foot of overlap distance for every 12 feet of working ladder length.

6.4 FIXED LADDER

- When ladders are used to ascend to heights exceeding 20 feet, landing platforms shall be provided for each 30 feet of height or fraction thereof. Except when there is no cage, well, or ladder safety device provided, then landing platforms shall be provided for each 20 feet of height.
- Where a man has to step a distance greater than 12 inches from the centerline of the rung of a ladder to the nearest edge of structure or equipment, a landing platform shall be provided. The minimum step-across distance shall be 2 1/2 inches.
- All landing platforms shall be equipped with standard railings and toe boards, so arranged as to give safe access to the ladder. Platforms shall be not less than 24 inches in width and 30 inches in length.
- Fall protection is required if working from a ladder over six feet above a lower level.
- Cages shall be provided on all fixed ladders longer than 20 feet unless:
 - The ladder is equipped with a ladder climbing device,
 - The ladder is equipped with a self-retracting lifeline, or
 - Each section of the ladder does not exceed 20 feet and has offset landing platforms with self-closing gates at each ladder transition.

CAERUS OIL AND GAS, LLC

HEALTH & SAFETY PLAN

Fire Prevention and Protection Safety Program

**Prepared
April 2016 By:**



**Caerus Oil and Gas, LLC
1001 17th Street, Suite 1600
Denver, Colorado 80202**

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1.0 FIRE PREVENTION AND PROTECTION SAFETY PROGRAM

This program is prepared for use by Caerus Oil and Gas, LLC (Caerus), to protect Employees from injury due to fire by ensuring that Employees are properly trained in the actions to be taken in response to a fire. Caerus Employees are not authorized to attempt to extinguish any fire that has progressed beyond the incipient stage. Additionally, only those Employees who have been adequately trained on the use of fire extinguishers or small hose systems are authorized to fight incipient stage fires. An incipient stage fire is a fire in its beginning stage which can be easily controlled with portable fire extinguishers and small hose systems. Caerus Employees involved with any fire that does not fit the incipient fire definition should evacuate and follow the established emergency response protocol.

1.1 PURPOSE

The purpose of this policy is to protect Employees from injury due to fire by ensuring that Employees are properly trained in the actions to be taken in response to a fire.

1.2 SCOPE

This program applies to all Caerus Employees. The program is written to comply with the following standards:

- 29 CFR Part 1910.155 – Fire Protection,
- 29 CFR Part 1910.157 – Portable Fire Extinguishers,
- 29 CFR Part 1910 Subpart L Appendix A – Fire Protection,
- 29 CFR Part 1926.155 – Fire Protection and Prevention.

This program covers the basic information on fires, the required training of Employees, fire extinguisher use, as well as OSHA fire prevention requirements.

2.0 RESPONSIBILITIES

2.1 EMPLOYEE RESPONSIBILITIES

- Comply with the contents of the Fire Prevention and Protection Safety Program;
- Be knowledgeable of the provisions of this program and participating in training;
- Discuss any uncertainties about fire safety with a Caerus Supervisor;
- Be familiar with the facility emergency action plan, understand the actions to be taken, and ensure that in the event of fire emergency actions are initiated promptly;
- Know whether or not they are authorized and trained to attempt extinguishing incipient stage fires;
- Do not attempt to extinguish any fire that has progressed beyond the incipient stage;
- Understand that injury prevention is Caerus's highest priority, and that fighting incipient stage fires, when authorized, should only be undertaken when it can be done safely;
- Report all Near Misses and Incidents to Caerus management.

2.2 FIELD SUPERVISOR AND MANAGEMENT RESPONSIBILITIES

- Inspect and maintain each fire extinguisher following Occupational Safety and Health Administration (OSHA) and National Fire Protection Association (NFPA) recommendations;
- Provide training for all Employees who engage in firefighting operations;
- Ensure that Employees understand their responsibilities under this policy;
- Ensure that Employees are trained in the facility emergency action plans and in fire extinguisher use and maintenance;
- Implement and enforce the procedures contained in this policy;
- Implement, support and enforce the Fire Prevention and Protection Safety Program and periodically evaluate its overall effectiveness.

2.3 CONTRACTOR RESPONSIBILITIES

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local laws, rules, and regulations. Despite operational urgency or importance, work shall not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own safety program and examine the related codes and standards applicable to their services. At a minimum contractors should:

- Comply with all applicable Federal, State, and local laws, rules, and regulations;
- Be knowledgeable of the provisions of this program and participating in training;
- Should any doubt arise as to the meaning or interpretation of Contractor Responsibilities, the Contractor should consult with the Caerus Management.
- Be familiar with the facility emergency action plan, understand the actions to be taken, and ensure that in the event of fire emergency actions are initiated promptly;
- Do not attempt to extinguish any fire that has progressed beyond the incipient stage;
- Understand that injury prevention is Caerus's highest priority, and that fighting incipient stage fires, when authorized, should only be undertaken when it can be done safely;
- Report all Near Misses and Incidents to Caerus Management.
- Inspect and maintain each fire extinguisher following Occupational Safety and Health Administration (OSHA) and National Fire Protection Association (NFPA) recommendations;
- Provide training for all Employees who engage in firefighting operations;
- Ensure that Employees understand their responsibilities under this policy;

3.0 TRAINING

Where the employer has provided portable fire extinguishers and other firefighting equipment for Employee use in the workplace, the employer should also provide an educational program to familiarize Employees with the general principles of fire extinguisher use and the hazards involved with firefighting.

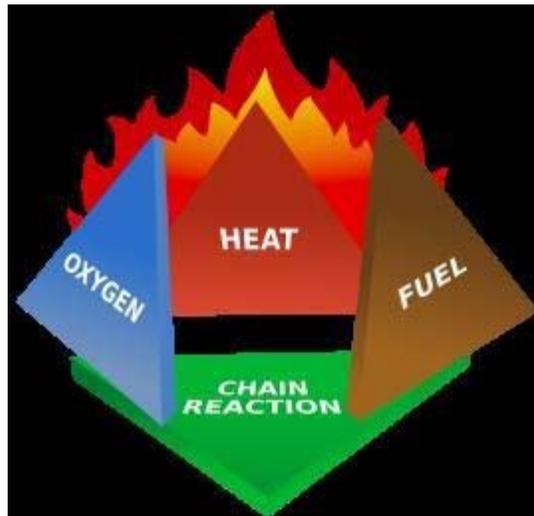
1. Training will be provided at the time of the Employee's initial assignment.
2. Training will be provided when there is a change in potential hazards.
3. Retraining will be provided whenever a periodic inspection reveals that there are inadequacies in the Employees' knowledge or use of these procedures.
4. Employees will be retrained on an annual basis at a minimum so that they are familiar with the Fire Prevention and Protection Program.
5. The Caerus Corporate Office will maintain training records. Caerus should keep records that demonstrate that Employees have been trained. Caerus should ensure that the records include the Employee's name, the trainer's name, the type of training, and the date(s) on which the training took place. Caerus should keep each training record for one year from the time it was made or until it is replaced with a new training record, whichever is shorter, and make it available for inspection and copying by OSHA on request.
6. Training should include:
 - The general principles of using fire extinguishers or hose lines;
 - The hazards associated with fire extinguishers or hose lines;
 - The hazards involved with firefighting and the procedures used to reduce these hazards;
 - The activation and operation of other fixed or portable fire protection systems that the employer expects Employees to use in the workplace.

4.0 BASICS OF FIRE

One generally accepted definition of fire, is a process involving rapid oxidation at elevated temperatures accompanied by the evolution of heated gaseous products of combustion and the emission of radiation. A fire begins by an external ignition source in the form of a flame, spark, or hot ember. This external ignition source heats the fuel in the presence of oxygen. As the fuel and oxygen are heated, molecular activity increases. If sufficiently heated, a self-sustaining chemical chain reaction occurs between the fuel and oxygen. Once ignition has occurred, the fire will continue until all the available fuel or oxidant has been consumed, the fuel and/or oxygen is removed, the temperature is reduced, or the number of excited molecules are reduced breaking the chain reaction.

4.1 THE FIRE TETRAHEDRON

For many years the concept of fire was symbolized by the Triangle of Combustion and represented, fuel, heat, and oxygen. Further fire research determined that a fourth element, a chemical chain reaction, was a necessary component of fire. The fire triangle was changed to a fire tetrahedron to reflect this fourth element. Essentially all four elements must be present for fire to occur, fuel, heat, oxygen, and a chemical chain reaction. Removal of any one of these essential elements will result in the fire being extinguished.



4.2 FIRE CLASSIFICATIONS

Fires are identified according to one or more fire classes. Each class designates the fuel involved in the fire, and thus the most appropriate extinguishing agent.

- **Class A Fires** involve ordinary combustibles, such as wood, cloth, and paper. This class of fire is fought by simply removing the heat, oxygen, or fuel, or by suppressing the underlying chemical reaction. The most common way to do this is by removing heat with water, removing oxygen by smothering with foam from a fire extinguisher, removing

fuel by strategies like backburning in forest fires, or breaking the chemical reaction by using an ammonium phosphate dry chemical powder fire extinguisher.

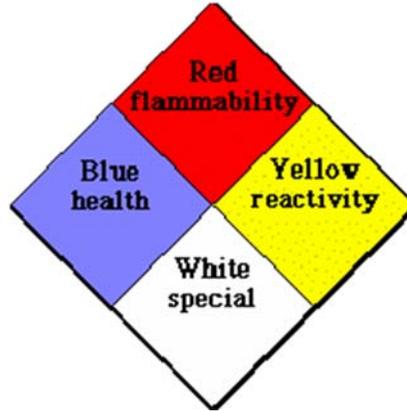
- **Class B Fires** involve liquids, greases*, and gases. A solid stream of water should never be used to extinguish Type B fires because it can cause the fuel to scatter, spreading the flames. The most effective way to extinguish these fires is by inhibiting the chemical chain reaction of the fire, which is done by dry chemical and Halon extinguishing agents, although smothering with CO₂ or for liquids, foam is also effective.
 - **Class K Fires** involve cooking oil or fats. Though such fires are technically a subclass of the flammable liquid/gas class, the special characteristics of these types of fires are considered important enough to recognize separately. The easiest way to smother a Class K fire is to cover it with a pan lid. These fires can also be smothered with baking soda, but it takes a lot of baking soda to do the trick. Class K fire extinguishers are designed to fight these types of fires.
- **Class C Fires** involve energized electrical equipment. Electrical fires may be fought in the same way as an ordinary combustible fire, but water, foam, and other conductive agents are not to be used. While the fire is, or could possibly be electrically energized, it can be fought with an extinguishing agent rated for electrical fires such as Carbon dioxide CO₂, FM-200 and dry chemical powder extinguishers.
- **Class D Fires** involve metals such as magnesium, titanium, zirconium, sodium, and potassium. Water and other common firefighting materials can excite metal fires and make them worse. The NFPA recommends that metal fires be fought with 'dry powder' extinguishing agents. Dry Powder agents work by smothering and heat absorption. Some extinguishers are labeled as containing dry chemical extinguishing agents. This may be confused with dry powder. The two are not the same. Using one of these extinguishers in place of dry powder, can be ineffective or actually increase the intensity of a metal fire.

4.3 FLASHPOINTS

The flashpoint of a chemical may be used to determine its flammability. Flashpoint information may be found on product labels, MSDS sheets, or the internet. The flashpoint of a liquid is the lowest temperature at which the liquid gives off enough vapor to be ignited. The lower the flashpoint, the greater the risk for ignition. Flammable liquids are considered flammable because their flashpoints are < 100°F. This means that flammable liquids burn easily at normal working temperatures. Combustible liquids have a flashpoint at or above 100°F. These liquids are less hazardous than flammable liquids but still pose a risk. The volatility of flammable and combustible liquids requires special storage and handling requirements.

4.4 NFPA CLASSIFICATION SYSTEM

The NFPA diamond is an easy way to determine the safety risks associated with hazardous materials. To determine a material's flammability refer to the red section of the diamond. A number in this section will indicate the flammability rating of the material.



The following numbering system is used to indicate flammability:

0	Material will not burn (water)
1	Material must be pre-heated before ignition can occur (corn oil)
2	Material must be moderately heated or exposed to relatively high ambient temperature before ignition can occur (diesel fuel)
3	Liquids and solids that can be ignited under almost all ambient temperature conditions (gasoline)
4	Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or that are readily dispersed in air and that will burn readily (propane gas)

NFPA diamonds can be found on product labels and Material Safety Data Sheets.

5.0 FIRE EXTINGUISHERS

Three basic types of workplaces:

- workplaces where the employer has chosen to evacuate all Employees from the workplace at the time of a fire emergency.
- workplaces where the employer has chosen to permit certain Employees to fight incipient stage fires and to evacuate all other non-essential Employees at the time of a fire emergency.
- workplaces where the employer has chosen to permit all Employees in the workplace to use portable fire extinguishers to fight incipient stage fires.

Caerus Employees are not authorized to attempt to extinguish any fire that has progressed beyond the incipient stage. Additionally, only those Employees who have been adequately trained on the use of fire extinguishers or small hose systems are authorized to fight incipient stage fires. An incipient stage fire is a fire in its beginning stage which can be easily controlled with portable fire extinguishers and small hose systems. Caerus Employees involved with any fire that does not fit the incipient fire definition should evacuate and follow the established emergency response protocol.

5.1 SELECTION OF FIRE EXTINGUISHERS

Portable fire extinguishers should be selected based on the anticipated workplace fire class(s). The National Fire Protection Association's (NFPA's) Standard No. 10 is often used as a guide for selection of fire extinguishers. Please refer to section 4.2 - Fire Classifications for possible fire extinguisher options.

5.2 DISTRIBUTION OF FIRE EXTINGUISHERS

Previous standards for distribution and mounting fire extinguishers have been criticized for requiring specific mounting locations. In recognition of this criticism, the standard has been rewritten to permit as much flexibility in extinguisher mounting as is acceptable to assure that fire extinguishers are available when needed and that Employees are not subjected to injury hazards when they try to obtain an extinguisher. OSHA does however clarify the required proximities of fire extinguishers in various circumstances as listed below:

- Travel distance from any point of the work area to the nearest fire extinguisher should not exceed 100 feet.
- At least one portable fire extinguisher should be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.
- At least one portable fire extinguisher should be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids.
- Pumpers should carry fire extinguishers in vehicles.
- Fire extinguishers in vehicles should be securely mounted in case of an accident.

5.3 INSPECTION, MAINTENANCE AND TESTING

The employer is responsible for the inspection, maintenance and testing of all portable fire extinguishers in the workplace. Portable extinguishers should be visually inspected monthly and should also be subjected to an annual maintenance check. The employer should record the annual maintenance date and retain this record for one year after the last entry or the life of the shell, whichever is less. The actual inspection, maintenance, and testing may be conducted by outside contractors with whom Caerus has arranged to do the work. When contracting for such work, Caerus should assure that the contractor is capable of performing the work that is needed to comply with this standard.

5.4 USE OF FIRE EXTINGUISHERS

The **PASS** acronym is used as a quick reference for fire extinguisher use:

- P** Pull the Pin at the top of the extinguisher. The pin releases a locking mechanism and will allow you to discharge the extinguisher.
- A** Aim at the base of the fire, not the flames. This is important in order to put out the fire, you must extinguish the fuel.
- S** Squeeze the lever slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.
- S** Sweep from side to side. Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher - different fire extinguishers recommend operating them from different distances.



6.0 FIRE PREVENTION

Throughout the regulations referenced for this program, OSHA provides guidelines for fire prevention. Some of these guidelines are summarized below.

General:

- No smoking on the drill rigs.
- Oil rags are to be stored in appropriate containers to prevent spontaneous combustion.
- Internal combustion engine powered equipment should be so located that the exhausts are well away from combustible materials. When the exhausts are piped to outside the building under construction, a clearance of at least 6 inches should be maintained between such piping and combustible material.
- Smoking should be prohibited at or in the vicinity of operations which constitute a fire hazard, and should be conspicuously posted: "No Smoking or Open Flame."
- Portable battery powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids, should be of the type approved for the hazardous locations.
- No temporary building should be erected where it will adversely affect any means of exit.
- Combustible materials should be piled with due regard to the stability of piles and in no case higher than 20 feet.
- The entire storage site should be kept free from accumulation of unnecessary combustible materials.
- Weeds and grass should be kept down and a regular procedure provided for the periodic cleanup of the entire area.
- When there is a danger of an underground fire, that land should not be used for combustible or flammable storage.
- No combustible material should be stored outdoors within 10 feet of a building or structure.
- All materials should be stored, handled, and piled with due regard to their fire characteristics.
- Flammable or combustible liquids should not be stored in areas used for exits, stairways, or normally used for the safe passage of people.

Dispensing Liquids:

- Areas in which flammable or combustible liquids are transferred at one time, in quantities greater than 5 gallons from one tank or container to another tank or container, should be separated from other operations by 25-foot distance. Drainage or other means should be provided to control spills. Adequate natural or mechanical ventilation should be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.
- Flammable or combustible liquids should be drawn from or transferred into vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.

- The dispensing units should be protected against collision damage. Dispensing devices and nozzles for flammable liquids should be of an approved type.
- Flammable liquids should be kept in closed containers when not in use.
- Leakage or spillage of flammable or combustible liquids should be disposed of promptly and safely.

Service and Refueling Areas:

- The tank trucks should comply with the requirements covered in the Standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA No. 385-1966.
- The dispensing hose should be an approved type, and the dispensing nozzle should be an approved automatic-closing type without a latch-open device.
- Clearly identified and easily accessible switch(es) should be provided at a location remote from dispensing devices to shut off the power to all dispensing devices in the event of an emergency.
- There should be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids. Conspicuous and legible signs prohibiting smoking should be posted.
- The motors of all equipment being fueled should be shut off during the fueling operation.

Liquefied Petroleum Gas:

- Valves, fittings, and accessories connected directly to the container, including primary shut off valves, should have a rated working pressure of at least 250 p.s.i. and should be of material and design suitable for LP-Gas service.
- Connections to containers, except safety relief connections, liquid level gauging devices, and plugged openings, should have shutoff valves located as close to the container as practicable.
- Shutoff valves should not be installed between the safety relief device and the container, or the equipment or piping to which the safety relief device is connected, except that a shutoff valve may be used where the arrangement of this valve is such that full required capacity flow through the safety relief device is always afforded.

CAERUS OIL AND GAS, LLC HEALTH & SAFETY PLAN

First Aid and Bloodborne Pathogen Safety Program

**Prepared
April 2016 By:**



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1.0 FIRST AID AND BLOODBORNE PATHOGENS

The First Aid and Bloodborne Pathogen Program is prepared for use by Caerus Oil and Gas, LLC (Caerus) to ensure that Employees are knowledgeable and trained in first aid procedures and protection from bloodborne pathogens in their work area. It also provides information on first aid supplies in the workplace.

1.1 PURPOSE

Many Caerus Employees are not located near an infirmary, clinic, or hospital in the course of their work day. Therefore, the Employees must be adequately trained to render first aid and cardiopulmonary resuscitation (CPR) until the person requiring the first aid or CPR can be transported to a hospital. The Employees should know how to protect themselves from bloodborne pathogens while rendering first aid and/or CPR. The program is written to comply with the Medical Services and First Aid Standard in 29 CFR Part 1910.151 and the Bloodborne Pathogens Standard in 29 CFR 1910.1030.

1.2 SCOPE

This program applies to all Caerus Employees who regularly work more than 10 minutes from a medical facility or work as Attendants and Standby Employees during confined space entries. It ensures that Employees will be properly trained and that adequate first aid supplies will be readily available. The program will ensure that Employees understand when and how to administer first aid and CPR in order to save lives and to minimize any potential risks to themselves and others.

Caerus will provide appropriate First Aid and CPR training in order to protect Employees and will take precautions to prevent Employees from being exposed to bloodborne pathogens and other potentially infectious bodily fluids. Caerus will inform and provide training to Employees concerning the protective measures available for responding to incidents involving these agents and provide the appropriate personal protective equipment (refer to Universal Precautions in Section 4.2).

2.0 RESPONSIBILITIES

2.1 EMPLOYEE RESPONSIBILITIES

- Be knowledgeable of the provisions of the First Aid program and participating in training when requested.
- Follow universal precautions when administering first aid or cleaning up and/or disposing of potentially infectious materials.
- Notify their supervisor of any potential workplace exposure to blood or other bodily fluids.

2.2 FIELD SUPERVISOR AND MANAGEMENT RESPONSIBILITIES

- Ensure that proper procedures are followed when responding to workplace injuries.
- Notify all Caerus Employees of any Employees who are designated to provide medical assistance during workplace emergencies.
- Participate in incident investigations, when requested, to determine if Employee exposure to possibly infectious materials may have occurred.
- Ensure that appropriate Employees are trained in First Aid and CPR.
- Implement and enforce the procedures contained in the First Aid Program.
- Ensure that all Caerus Employees understand their responsibilities under this program.
- Maintain, periodically review, and, when necessary, modify the program as required.

2.3 CONTRACTOR RESPONSIBILITIES

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local laws, rules and regulations. Despite operational urgency or importance, work shall not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own safety program and examine the related codes and standards applicable to their services. At minimum contractors should:

- Comply with all applicable Federal, State, and local laws, rules and regulations;
- Ensure that all Employees are adequately trained for the duties they are expected to perform;
- Document training of Employees and keep records of training;
- Adhere to the procedures outlined in this program;
- Report all Near Misses and Incidents to Caerus Management;
- Correct observed unsafe acts and report unsafe conditions;
- Should any doubt arise as to the meaning or interpretation of Contractor Responsibilities, the Contractor should consult with the Caerus Management.

3.0 TRAINING AND DOCUMENTATION

First Aid, CPR, and Bloodborne Pathogen Training shall be provided to the following Caerus Employees:

- All field Employees whose work is more than 10 minutes from a medical facility;
- Employees who work as Attendants and Standby Employees during confined space entries.

All Caerus Employees are encouraged to take CPR/First Aid training when offered. Caerus Employees are not required to render first aid or CPR unless the performance of first aid is part of their job description or assigned duties (confined space attendant).

Training in First Aid and CPR shall be provided by a certified trainer such as the American Red Cross. Caerus Employees shall receive First Aid and CPR training prior to initial assignment (when job duty requires) and refresher training every two (2) years. They should receive and maintain a valid training completion card.

Training documents should be retained for the following length of time:

RECORD	CUSTODIAN	RETENTION
Training Records	Caerus Corporate Office	5 years
First Aid Training Program	Caerus Corporate Office	1 year after revised, superseded or obsolete

4.0 PROCEDURES

4.1 FIRST AID MATERIALS

First aid kits are required in all Caerus company vehicles and at the Caerus Corporate Office. First aid kits shall be conveniently located and all Employees must know where they are located.

First aid kits/supplies shall include appropriate personal protective equipment for bloodborne pathogens. The kits/supplies shall be routinely inspected to ensure they are adequately stocked. The inspection should be documented.

Where the eyes or body of any person may be exposed to injurious corrosive materials, the first aid kits must include sterile water for quick drenching or flushing of the eyes and body.

4.2 UNIVERSAL PRECAUTIONS

Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. According to the concept of Universal Precautions, all human blood and human bodily fluids are treated as if known to be infectious for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and other bloodborne pathogens.

Caerus Employees who are trained in First Aid and CPR will consider all body fluids to be potentially infectious materials, and practice Universal Precautions if these materials are encountered.

CAERUS OIL AND GAS, LLC HEALTH & SAFETY PLAN

Hydrogen Sulfide Gas Safety Program

**Prepared
April 2016 By:**



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1.0 HYDROGEN SULFIDE EXPOSURE CONTROL

The Hydrogen Sulfide Gas Safety Program is prepared for use by Caerus Oil and Gas, LLC (Caerus) to minimize personnel exposures to hydrogen sulfide (H₂S) gas through the use of facility surveys, engineering and workplace controls, safe work procedures, and personal protective equipment.

1.1 PURPOSE

The purpose of this program is to ensure that hydrogen sulfide hazards are identified and eliminated or controlled, and that personnel exposures to hydrogen sulfide are controlled and monitored. It will ensure that personnel who work in environments where hydrogen sulfide may be present are adequately trained and protected through the use of safe work practices and personal protective equipment (PPE) when H₂S hazards cannot be eliminated.

The program is written to comply with the American National Standards Institute (ANSI) Standard Z390.1-1995: Accepted Practices for Hydrogen Sulfide Safety Training Programs, and American Petroleum Institute (API) Recommended Practice (RP) 49: Recommended Practices for Drilling and Well Servicing Operations Involving Hydrogen Sulfide.

1.2 SCOPE

The Hydrogen Sulfide Exposure Control Program applies to all Caerus employees. Program definitions are contained in Appendix A.

Exemption: Facilities not covered by this program are those where it has been confirmed that H₂S is either not present (via surveys, gas samples, etc.), or where periodic atmospheric testing has confirmed that the maximum ambient concentrations have never reached or exceeded 10 parts per million (ppm) and are unlikely to do so (including inside confined spaces such as tank head spaces, pressure vessels, etc.).

Note: 10 ppm is the permissible exposure limit (PEL) allowed by the Occupational Safety and Health Administration (OSHA) for an 8-hour employee exposure.

2.0 RESPONSIBILITIES

2.1 CAERUS EMPLOYEE RESPONSIBILITIES

- Be knowledgeable of the provisions of this program and participating in training when requested by Caerus Management;
- Follow safe work practices including the use of respirators;
- Complete medical evaluation(s) processes required by this program;
- Complete training required by this program;
- Inform Field Supervisor of any hazards the employee feels are not adequately addressed in this program;
- Report all Near Misses and Incidents to Field Supervisor;
- Comply with the Caerus Hydrogen Sulfide Gas Safety Protection Program.

2.2 FIELD SUPERVISOR AND MANAGEMENT RESPONSIBILITIES:

- Ensure that personnel properly utilize and calibrate personal and portable toxic gas detectors (personal monitors) by observing employee actions in the field;
- Ensure the availability and proper use of appropriate respiratory protection equipment;
- Be aware of tasks requiring respiratory protection, ensure that respirators are worn properly and that standby personnel/rescue personnel are provided/utilized as needed;
- Ensure that engineering controls are maintained in working condition (where applicable);
- Arrange for and/or conduct training for working in H₂S environments;
- Ensure that employees receive appropriate training, fit testing, and medical evaluations in accordance with this Program, by periodically auditing records;
- Designate tasks and facilities where workers must observe specialized work practices for hydrogen sulfide by conducting appropriate facility surveys;
- Identify work areas, processes and tasks that require the use of engineering controls;
- Maintain required records in accordance with record keeping requirements in Sec. 9;
- Ensure effective implementation of this Program through periodic audits;
- Ensure that all Caerus personnel understand their responsibilities under this program;
- Maintain, periodically review, and modify the program as required.

2.3 CONTRACTOR RESPONSIBILITIES

Caerus expects its Contractors to take appropriate measures to protect all persons and property and to comply with all applicable Federal, State, and local laws, rules, and regulations. Despite operational urgency or importance, work should not be conducted at the expense of safety, the environment, or the health of the workers or the public. In order to meet this expectation, Contractors should follow their own safety program and examine the related codes and standards applicable to their services. At a minimum contractors should:

- Comply with all applicable Federal, State, and local laws, rules, and regulations;
- Report all Near Misses and Incidents to Caerus management;
- Correct observed unsafe acts and report unsafe conditions;
- Document training of personnel and keep records of training;
- Ensure that employees receive appropriate training, fit testing, and medical evaluations in accordance with this Program, when required;
- Ensure that personnel properly utilize and calibrate personal and portable toxic gas detectors (personal monitors);
- Ensure the availability and proper use of appropriate respiratory protection equipment;
- Be aware of tasks requiring respiratory protection, ensure that respirators are worn properly and that standby personnel/rescue personnel are provided/utilized as needed;
- Ensure that engineering controls are maintained in working condition (where applicable);
- Identify work areas, processes and tasks that require the use of engineering controls;
- Designate tasks and facilities where workers must observe specialized work practices for hydrogen sulfide by conducting appropriate facility surveys;
- Arrange for and/or conduct training for working in H₂S environments;
- Should any doubt arise as to the meaning or interpretation of Caerus expectations, the Contractor should consult with the Caerus management;
- Implement and enforce the procedures contained in the Hydrogen Sulfide Gas Safety Program.

3.0 TRAINING AND DOCUMENTATION

Prior to working in an environment which might expose personnel to hazardous concentrations of hydrogen sulfide, training should be provided for each affected person and a card (or other certification), signed by the instructor, should be furnished certifying that he/she has successfully completed the training program.

Qualified H₂S training instructors should have successfully completed an appropriate train-the-trainer development course. Training credentials or certification from a recognized or accredited training authority constitutes qualification under this program.

Training should be conducted annually and include the following:

- The hazards of exposure to H₂S, including the permissible exposure limit (PEL);
- The physical and chemical characteristics of hydrogen sulfide;
- The physiological effects of exposure and their relationship to the concentration of H₂S in air;
- Human reactions including the effect on smell and the results of inhalation,
- Sources of hydrogen sulfide;
- Identification and use of personal protective equipment (PPE), including use, care, inspection and servicing of equipment (respiratory protection training is an integral portion of this training, and this program should be used in conjunction with the Caerus Respiratory Protection Program);
- Importance and use of ventilation equipment;
- Use, care and calibration of monitoring equipment;
- Emergency procedures and first aid for exposures to hydrogen sulfide;
- Importance and use of wind indicators;
- Use of the Buddy System and the requirement for standby personnel under certain conditions;
- The existence of sulfur dioxide (SO₂) and the hazards it presents;
- The importance of material compatibility and selection;
- The existence of hydrogen sulfide contingency plans and emergency responses to accidental releases;
- Other relevant information specific to the site or area where work is performed.

In accordance with the Hazard Communication Program, a Material Safety Data Sheet (MSDS) for hydrogen sulfide should be available at field offices and all areas where H₂S may be encountered.

Fit-testing and respiratory protection training should be conducted in accordance with the Respiratory Protection Program.

4.0 PROPERTIES OF HYDROGEN SULFIDE

4.1 H₂S PROPERTIES

Hydrogen sulfide is a highly toxic, flammable, colorless gas that is heavier than air. Its chemical formula is H₂S (2 parts hydrogen and 1 part sulfur). It is produced in nature primarily through the decomposition of organic material by bacteria. H₂S is most frequently encountered in the production and refining of high-sulfur petroleum, in sewers, and in manure pits. Hydrogen sulfide is also referred to as Sour Gas, Sulfuretted Hydrogen, Sulfur Hydride, Hydrosulfuric Acid, and Sewer Gas. An MSDS for hydrogen sulfide is contained in Appendix B.

Although H₂S has a distinct “rotten egg” smell, the odor cannot be relied upon as an adequate warning of the presence of H₂S. At high H₂S concentrations, olfactory fatigue occurs. Olfactory fatigue is a condition in which there is a loss of odor perception, and a person's nose is no longer able to detect the odor, even though the substance is present. At high H₂S concentrations, a person can no longer smell its presence. It is also at these high concentrations that inhalation of H₂S gas can be fatal.

Because H₂S is heavier than air, it does not readily dissipate. It can spread for long distances at ground level and affect employees a considerable distance from the source of the gas. H₂S gas tends to accumulate in low-lying areas such as ditches, trenches, and culverts.

H₂S can also accumulate in buildings and confined spaces. Employees should be especially careful about entering areas that have not been “aired out” recently. A gas monitor (Sec. 5) should be used to check H₂S levels before entering any unoccupied buildings. Confined spaces should only be entered in accordance with the Caerus Confined Space Program.

4.2 H2S TOXICITY TABLE

The table below lists the responses to exposure of increasing H2S concentrations.

Concentration of H2S	Response to Exposure
1 part per million (ppm*)	Person can smell the gas (odor of rotten eggs).
10 ppm	Allowable for 8 hours exposure time.
100 ppm	Kills smell in 3 to 15 minutes (this is olfactory fatigue). Gas may burn eyes and throat.
200 ppm	Kills smell rapidly (olfactory fatigue). Gas burns eyes and throat.
500 ppm	Person loses sense of reasoning and balance. Respiratory disturbances in 2 to 15 minutes. Needs prompt artificial resuscitation.
700 ppm	Person will become unconscious quickly. Breathing will stop and death will result if not rescued promptly and given immediate artificial resuscitation.
1,000 ppm	Person will become unconscious immediately. Permanent brain damage or death may result unless they are rescued promptly.

*ppm = Parts of gas per million parts of air by volume

4.3 HYDROGEN SULFIDE EXPOSURE LIMITS

A level of H2S gas at or above 100 ppm is Immediately Dangerous to Life and Health (IDLH). Entry into IDLH atmospheres can only be made using: 1) a full facepiece pressure demand self-contained breathing apparatus (SCBA) with a minimum service life of thirty minutes, or 2) a combination full facepiece pressure demand supplied-air respirator with an auxiliary self-contained air supply.

If H2S levels are below 100 ppm, an air-purifying respirator may be used, assuming the filter cartridge/canister is appropriate for hydrogen sulfide. A full facepiece respirator can be utilized to prevent eye irritation.

If air concentrations are elevated, eye irritation may become a serious issue. If a halfmask respirator is used, tight fitting goggles must also be used.

Chemical Abstracts Registry Number (a)	Chemical Name	PEL (d)		Ceiling (g)	STEL (o)	
		ppm (e)	mg/M ^{3(f)}		ppm (e)	mg/M ^{3(f)}
7783064	Hydrogen sulfide	10	14	50 ppm	15	21

4.4 EFFECTS OF H₂S ON PERSONNEL

Hydrogen sulfide has numerous symptoms of exposure. It irritates the mucous membrane and respiratory tract. It can cause nausea, headaches, delirium, disturbed equilibrium, tremors, convulsions, and skin and eye irritation. Pulmonary edema, an abnormal build up of fluid in the lungs, can occur after exposure to high H₂S concentrations.

Central nervous system (CNS) injury is immediate and significant after exposure to high concentrations of H₂S. At high concentrations, only a few breaths can lead to immediate loss of consciousness, coma, respiratory paralysis, seizures, and death.

The following behavior can be symptoms of H₂S exposure. If they are observed in a coworker or yourself, take action and evacuate the area immediately.

- Dizziness;
- Headache;
- Nausea;
- Excitability;
- Irrational behavior;
- Rapid breathing;
- Persistent cough;
- Impaired gait;
- Tremors;
- Unconsciousness.

4.5 EFFECTS OF H₂S ON EQUIPMENT

H₂S dissolved in water is corrosive to all metals. It can cause severe damage to industrial materials such as valves and piping and can cause sulfide stress cracking.

Tool joints, hardened parts of blowout preventers and valve trim are also susceptible to brittle failure caused by sulfide stress cracking. There is usually a time period during which no damage is observed, followed by a sudden, catastrophic failure. Employees working in areas with H₂S in the process stream should be especially vigilant when checking equipment for corrosion.

In gas compressors operating on natural gas containing hydrogen sulfide, considerable amounts of hydrogen sulfide may get into the lubricating oil, because H₂S is very oil-soluble. When this happens, the metals and alloys that are in contact with hydrogen sulfide-saturated oils are also subject to severe hydrogen sulfide corrosion and subsequent corrosion fatigue of the metal parts.

4.6 EFFECTS OF SULFUR DIOXIDE (SO₂)

When ignited, H₂S will produce sulfur dioxide (SO₂), another toxic gas. SO₂ is extremely hazardous if inhaled, and may leave victims with a disability from chemical pneumonia or pulmonary edema. Employees should avoid flare stacks and pits if H₂S is flared or ignited.

5.0 SURVEYS AND MONITORING

The following requirements are based on whether the area may have or could develop a high enough H₂S concentration to cause employee fatalities.

5.1 TYPES OF AREAS

H₂S Area - An area, well, or other facility capable of having ambient H₂S concentrations reaching 10 ppm. For an H₂S area, the following requirements should apply:

- Hydrogen sulfide training is required for all employees and contractor personnel working in these areas.
- The use of a Hydrogen Sulfide Personal Alarm Monitor is required for all workers at all times while on location. If employees wear a supplied air respirator, personal alarm monitors for H₂S are not required but area monitoring must be conducted to confirm that the IDLH limit is not exceeded.
- Casual visitors to H₂S areas are required to have a briefing on the H₂S alarms and emergency exiting and must be closely accompanied by an employee carrying a Personal Alarm Monitor. Casual visitors are not allowed in areas where the work or situation may cause the ambient H₂S concentrations to exceed 10 ppm.
- Respiratory protection for emergency escape should be readily available where egress is limited or restricted.
- If the hydrogen sulfide concentration exceeds 10 ppm at any time while personnel are at the location, all personnel should evacuate to a safe area and should not reenter the area without an approved positive-pressure self-contained breathing apparatus or supplied-air (air-line) respirator with a full-face piece and emergency egress bottle (minimum 5 minute air supply), unless the concentration is reduced to below 10 ppm.
- One or more standby personnel are required while working with a supplied-air (air-line) respirator.
- No beards or similar facial hair (except approved moustaches) are permitted in these areas.
- One or more wind direction indicators (wind socks) should be clearly visible at all times.
- H₂S warning signs should be posted.
- No ignition sources are allowed except by permit.
- Personnel should be familiar with emergency evacuation or contingency plans, including safe areas of refuge.
- Fixed monitoring equipment should be considered for all unmanned facilities.

High H2S Area – An area, well or other facility capable of having an ambient concentration of hydrogen sulfide is 300 ppm or greater.

- If the ambient concentration of H2S is 300 ppm or greater, only specially approved tasks and emergency operations should be permitted.
- All of the previously mentioned H2S area requirements apply and regular work activities will not be permitted unless the concentration is reduced below 300 ppm by ventilation or other engineering controls.
- A Safe Work Permit (Appendix C) should be completed and reviewed prior to undertaking work in a high H2S area.
- All personnel working in a high H2S area should be supervised by a Caerus Supervisor who is competent by virtue of training and experience. Any safety deficiencies noted should be immediately communicated to the Caerus Supervisor for immediate correction and/or temporary interruption of the work.
- Continuous monitoring for explosive atmospheres with an approved instrument which alarms at 10% of the lower explosive limit is required.
- Approved respiratory protection should be utilized (refer to the Caerus Respiratory Protection Program for further details).
- Rescue provisions and equipment are required onsite, including communication systems with the persons performing the work.
- Personnel who will be expected to perform a rescue should be adequately equipped, trained, and physically able to perform a rescue operation if needed. Rescue personnel may also perform the standby duties.
- Contractor personnel should not be utilized in high H2S areas unless specifically trained for the hazardous work.
- One or more wind direction indicators (wind socks) should be clearly visible at all times.
- No ignition sources are permitted.
- Personnel should be familiar with emergency evacuation/contingency plans, including areas of safe refuge.

5.2 INITIAL FACILITY SURVEYS

All facilities should be surveyed initially to determine if H2S is present, to identify what exposures may exist, and to quantify the exposure potential. Surveys can include area measurements with direct reading instruments, source measurements or other objective data providing similar information (e.g., laboratory analysis of the production streams) and a review of incident and injury records to determine problem sources of H2S.

Measurements to evaluate the potential for the development of an IDLH atmosphere should be conducted as a part of the initial survey.

5.3 PERIODIC FACILITY SURVEYS

Periodic facility surveys should be made to determine the ongoing effectiveness of exposure controls and revalidate H₂S levels associated with work areas and H₂S sources. Additional surveys should be made as soon as practical when there has been a change in the process, work practice, or other reason that may result in increased levels of hydrogen sulfide in the facility.

Facilities that have operations with H₂S levels lower than 10 ppm should be reevaluated at least once every 3 years to confirm that the H₂S concentration of the product stream has not increased.

5.4 HYDROGEN SULFIDE DETECTION EQUIPMENT

Fixed monitoring systems, personal monitors and portable gas detection equipment are all appropriate detection systems for H₂S. The equipment should be listed or approved for use with hydrogen sulfide, and should be calibrated (with documentation) and maintained in proper condition in accordance with the manufacturer's established calibration procedures. Portable instruments should also be examined for proper operation by the user prior to each use. Detection equipment should be set to initially alarm at no higher than 10 ppm. If a detector, monitor or instrument is found to be defective, it should be removed from service and disposed of or tagged with a note for repair.

5.4.1 FIXED MONITORING SYSTEMS

Fixed monitoring systems should be considered for enclosed areas that have a potential for hydrogen sulfide gas concentrations to exceed 10 ppm. They are recommended for process or other areas where a release would result in a concentration of hydrogen sulfide above the IDLH level that may result in a radius of exposure that includes dwellings, public and private occupancies, and places of assembly.

Standalone temporary detection stations that transmit signals electronically or by hardwire may be utilized when fixed equipment is out of service.

5.4.2 PERSONAL ALARM MONITORS

Personal alarm monitors or similar H₂S detection devices should be used to supplement established work practices. Personal monitors should be worn by all personnel assigned to work in areas where hydrogen sulfide is or may be present and should be worn such that the device or the sensing media is outside the outermost layer of clothing worn by the employee.

Personal monitors should not be used in lieu of other more reliable exposure control measures (e.g. multi-gas monitors) for confined space entry, emergency rescue, or for tasks involving

H₂S-containing sources which have the potential for rapid increase of H₂S in excess of the IDLH limit.

The routine use of Personal Monitors requires daily operational checks of the monitor, regular calibration checks of alarm settings, and knowledge of how to react when the alarm sounds.

Personal alarm monitors for use in high noise environments should include provisions for a vibrating alarm, or should be worn on the hard hat or shirt collar to assure detection of alarm activation.

When personal monitors are used for tasks involving H₂S levels potentially in excess of the 10 ppm PEL, the work procedure should include:

- Instructions to exit the area when the alarm sounds.
- Procedures for reentry which state that reentry is only permitted with appropriate respiratory protection and backup personnel or by conducting air monitoring to confirm that exposure levels are acceptable.

5.5 PERSONAL EXPOSURE MONITORING

Personal monitoring should be performed to quantify the full-shift and short-term exposure potential for job assignments which may result in exposures to hydrogen sulfide. Representative full shift time-weighted average (TWA) samples, 15-minute STEL samples and peak concentration monitoring should be conducted.

When initial personal monitoring results indicate employee exposure at or in excess of the PEL, additional monitoring should be conducted to confirm the exposure.

Employees whose hydrogen sulfide exposures exceed the PEL should be monitored annually. Non-routine exposures should be monitored whenever practical.

When monitoring results indicate employee exposure is less than the PEL, no further monitoring is required, unless workplace conditions or job assignments change.

Additional monitoring should be performed whenever there are changes in the method or type of production or process, control equipment, or work practices which may result in new or additional employee exposures to H₂S.

Employees should be notified in writing as soon as practical after obtaining the monitoring results. Monitoring data should be documented and retained in accordance with the Recordkeeping section of this program.

5.6 MEDICAL SURVEILLANCE

All employees who work in H₂S areas and utilize respiratory protection equipment will be subject to the Caerus Respiratory Protection Program and should be evaluated in accordance with the requirements of that program.

6.0 API RECOMMENDED WORK PRACTICES

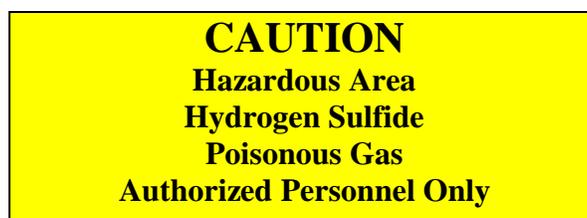
The American Petroleum Institute (API) has developed specific H2S work practice documents. The use of these guidelines is recommended where applicable and when not in conflict with established company guidelines.

Examples of general work practices include, but are not limited to:

- Use of wind direction indicators (wind socks) to determine safe areas for refuge;
- Signage, labels, and other warnings as appropriate to communicate the presence of hydrogen sulfide;
- Controlling access to hazardous areas and allowing entry only to trained personnel.

Where appropriate or when required by local regulation, the fencing of facilities and the use of caution signs and labels should be used to alert employees and the general public to operations where there is a potential exposure to H2S.

Wording for caution signs should be:



Labeling schemes for containers and vessels containing H2S should meet the requirements of the Caerus Hazard Communication Program. Where Hazard Communication labels are utilized the following target organ wording should be used:

Danger - Extremely Flammable Gas - Hydrogen Sulfide Gas
Can Cause Eye and Respiratory Irritation and Asphyxiation

Where engineering controls are not feasible, the following special work practices should be utilized depending on the type of process or job task and the potential for exposure to hydrogen sulfide. Refer to the Caerus Respiratory Protection Program for additional information regarding respiratory protection.

For tasks involving entry into IDLH atmospheres, unknown H2S atmospheric concentrations, or atmospheres which have the potential to become IDLH, entry should be made with positive-pressure atmosphere-supplying respiratory protection. Methods should be employed to determine the H2S concentration prior to work being performed. Work conducted in an IDLH atmosphere should be authorized and documented with a Safe Work Permit. One or more

standby persons with respiratory protection (with a separate air source) should be present and in visual or voice contact at all times with the respirator wearer working in the hazardous area. Appropriate provisions for rescue should be made prior to commencing work in the hazardous area.

For tasks involving exposure to H₂S concentrations exceeding the PEL, such as areas around tanks and certain process vessels (e.g., sampling/gauging sour storage tanks, etc.), the use of positive-pressure atmosphere-supplying respiratory protection is required. A standby person (with a separate air source) should be present and in visual or voice contact at all times with the respirator wearer working in the hazardous area. When appropriate, additional provisions for rescue should be made.

For tasks involving confined space entry (e.g., vessel entry) where H₂S may be present, work should be authorized and documented with a Safe Work Permit and Confined Space Entry Permit in accordance with the Caerus Confined Space Program.

7.0 PROTECTION OF PERSONNEL

Engineering controls such as ventilation are the preferred method of protecting employees from H₂S exposure. Only when engineering controls are not feasible or effective should PPE be relied upon for protection from H₂S.

7.1 ENGINEERING CONTROLS

Engineering control measures should be used, whenever feasible, to reduce and maintain employee exposures below the PELs. Examples of engineering controls include, but are not limited to:

- Remote gauging systems or sealed sight glasses on vessels and storage tanks;
- Fixed Stationary Alarm Monitors where there are hazardous concentrations of H₂S (These may also be required for certain operations and structures/enclosures depending on regulatory requirements);
- Vapor recovery units, flares or remote vents;
- Lease automatic custody transfer units (LACT) for transferring product automatically;
- Fencing of facilities to secure against unauthorized access;
- Air blowers for ventilating equipment;
- Chemicals used in processes to suppress H₂S generation or enhance removal;
- Local exhaust hoods for laboratory or similar installations.

7.2 RESPIRATORY PROTECTION

Respiratory protection should be used if engineering controls are not feasible or are not sufficient to reduce exposures within the established limits.

All employees who, as a part of their regular duties, are required to wear respirators to minimize their exposure to H₂S should be covered by the Caerus Respiratory Protection Program.

Acceptable types of respirators include:

- Positive-pressure self-contained breathing apparatus (Scott, MSA or equivalent) are acceptable for all hydrogen sulfide environments;
- Positive-pressure supplied-air (air-line) respirators with a full-face piece with escape bottle;
- Emergency escape units (e.g., egress bottle with five-minute air supply) should be used only for emergency egress in areas where high concentrations of H₂S may develop, or in conjunction with an air-line respirator;
- Closed-circuit self-contained breathing apparatus (CCSCBA) is permitted only for emergency escape from developing hazardous atmospheres;

- Single use, mouth-piece type, escape-only cartridge respirators - for use during emergency egress from an area where the concentration of H₂S gas is expected to be below 10 ppm during regular work activities, but where an accidental release of H₂S might occur, but does not exceed the maximum concentration the respirator is approved for (usually 100 – 150 ppm);
- **No other types of respiratory protection should be used** in atmospheres which contain or have the potential to contain hydrogen sulfide.
- **Cartridge-type respirators are not acceptable** for use in atmospheres with a high H₂S concentration.

For tasks involving exposure to H₂S concentrations exceeding the PEL, such as areas around tanks and certain process vessels (e.g., sampling/gauging sour storage tanks, etc.), the use of **positive-pressure atmosphere-supplying respiratory protection** is required. A standby person (with a separate air source) should be present and in visual or voice contact at all times with the respirator wearer working in the hazardous area. When appropriate, additional provisions for rescue should be made.

7.3 EYE AND SKIN PROTECTION

PPE should be worn where appropriate to prevent eye and skin contact with liquids containing hydrogen sulfide and eye irritation from exposure to airborne concentrations of H₂S (below the PEL).

Gloves - Gloves made of nitrile or neoprene rubber, or other suitable materials approved to be used for protection of the hands against absorption of hydrocarbons.

Goggles - Non-vented goggles should be worn if the concentration of H₂S is not sufficient to warrant the use of a respirator but eye irritation exists. Goggles should also be used when handling hydrocarbons containing dissolved hydrogen sulfide if there is any possibility of splashing the material into the eyes.

Chemical Protective Clothing - Where atmospheres with high concentrations of H₂S exist, chemical protective clothing may be necessary to prevent irritation to damp exposed skin. This would normally only be a concern during emergency operations since entry into this type of atmosphere would not be undertaken under normal circumstances.

8.0 EMERGENCY SITUATIONS

Employees should be trained to act quickly during an emergency. High levels of H₂S can overcome a person in seconds. Always know the direction that the wind is blowing by regularly checking the wind sock. This knowledge can save precious seconds during an emergency.

8.1 FIRST AID

Where exposure to H₂S in excess of the IDLH is foreseeable, emergency response personnel should be trained in first aid and cardiopulmonary resuscitation (CPR). When facilities are located remotely from emergency medical services, consideration should be given to maintaining oxygen on hand and providing it to personnel if overcome by hydrogen sulfide.

8.2 RESCUE PERSONNEL

Rescue personnel, when required by this program, should be provided with appropriate respiratory protection and other equipment necessary for the task involved. This may include retrieval lines, wrist cuffs, or other retrieval and emergency equipment. Non-entry rescue methods should be used whenever feasible.

8.3 EMERGENCY EVACUATION PLAN

Each work location where exposure to hydrogen sulfide is possible should have a copy of the Caerus Incident Response Plan and, if developed, an H₂S Emergency Contingency Plan outlining the procedures to follow in the event of a sudden release of hydrogen sulfide.

Caerus personnel and on-site contractors should be familiar with the provisions contained in the plan and it should be reviewed with personnel prior to initial assignment to the job and whenever changes are made to the plan. The plan addresses the identification of emergency evacuation routes and areas of safe refuge, methods or signals to alert personnel of an emergency condition, reporting procedures and any other emergency procedures specific to the location.

8.4 FIRE PROTECTION

Adequate measures should be taken to eliminate the risk of fire and explosion on any site where hydrogen sulfide may be present.

9.0 RECORDKEEPING REQUIREMENTS

The Caerus Corporate Office should maintain employee training records, monitoring data, and alarm calibration records for the following length of time:

Record	Custodian	Retention
Employee Training Records	Caerus Corporate Office	30 years following term of employment
Facility Atmospheric Monitoring Data	Caerus Corporate Office	30 years following term of employment
Employee Exposure Monitoring Summaries	Caerus Corporate Office	30 years following term of employment
Employee Exposure Notifications	Caerus Corporate Office	30 years following term of employment
Monitor Calibration Records (Fixed and Portable)	Caerus Corporate Office	30 years following term of employment

APPENDIX A: DEFINITIONS

Air-line Respirator - An atmosphere-supplying respirator for which the atmosphere is supplied to the respirator through a hose from a source not carried by the wearer. An emergency egress bottle with a minimum 5 minute emergency air supply must be integral with the respirator. Air- lines for respirators should not exceed 100 feet in length unless approved by NIOSH in accordance with the manufacturer's certification for the respirator.

Atmosphere-Supplying Respirator - A respirator that supplies the user with breathing air from a source independent of the ambient atmosphere.

Casual Visitor - Any visitor (Caerus employee or outside personnel) who is unfamiliar with the area or facility and is there for purposes other than performing work (e.g. tour groups, executive management, etc.). Facility supervisors should approve field visits by casual visitors. Casual visitors should receive a general site specific safety briefing. Personnel such as salespersons, delivery persons and similar persons are typically not covered as casual visitors.

Covered Employee - An employee who is covered under a criteria defined in an EH&S Program which requires the employee to have medical surveillance. Typical criteria may include exposures that exceed the occupational exposure limit, the Action Level, or some other criteria.

Emergency - An unintentional incident that results in the disruption of normal activities and may include an actual or potential uncontrolled release of an airborne contaminant, fire, explosion, injuries and/or property damage.

Emergency-use Respirator - A respirator placed in or near the work area for use in an emergency

Employee Exposure - The level of exposure to an airborne contaminant that would occur if the employee were not using respiratory protection.

Engineering Controls - Control measures utilized to prevent or reduce atmospheric contamination at the source by confinement, enclosure, local ventilation, dilution ventilation and substitution of less toxic materials (or other acceptable methods).

Escape-only Respirator - A respirator which is acceptable for use only for emergency escape from a developing hazardous atmosphere.

Exclusive-use Respirator - A respirator assigned to and used by only one employee.

Fit Test - The use of an approved protocol to evaluate the effectiveness of the seal of a respirator to the face of an individual.

H2S Area - An area or other facility capable of having ambient H2S concentrations reaching or exceeding 10 ppm.

High H2S Area - A situation where the ambient concentration of hydrogen sulfide is known or anticipated to reach or exceed 300 ppm during the performance of work or during an emergency.

Immediately Dangerous to Life and Health (IDLH) - An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects or would impair an individual's ability to escape from a dangerous atmosphere (e.g. a concentration of H2S at 300 ppm or above (OSHA) or 100 ppm (NIOSH) or a concentration of oxygen at less than 19.5%).

LHCP – Licensed health care professional.

Permissible Exposure Limit (PEL) – The permissible exposure concentration allowed by OSHA for an 8-hour Time Weighted Average (TWA).

Positive-Pressure Respirator - A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Qualitative Fit Test - A pass/fail test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative Fit Test - An assessment of the adequacy of the respirator fit by numerically measuring the amount of leakage into the respirator.

Rescue Personnel - Personnel that are designated and trained in the rescue of personnel who are unable to exit unaided from a hazardous environment.

Respirator Use Area - A designated work area where respiratory protection is required to protect employees from a hazardous atmosphere.

Self-Contained Breathing Apparatus (SCBA) - An atmosphere-supplying respirator for which the source of breathing air is designed to be carried by the wearer.

Stand-by Personnel - A person(s) outside of the respirator use area who has been trained and is responsible for monitoring the activity of personnel inside the respirator use area and the status of the air supply for air line respirators.

Supplied-air Respirator (SAR) - A self-contained breathing apparatus (SCBA) or air-line respirator.

User Seal Check - An action conducted by the respirator user to determine if the respirator is properly seated to the face and to verify proper valve operation.

APPENDIX B: MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

HYDROGEN SULFIDE

August 31, 1995

PHILLIPS 66 COMPANY	PHONE NUMBERS
A Division of Phillips Petroleum Company	Emergency: (918) 661-8118
Bartlesville, Oklahoma 74004	General MSDS Information: (918) 661-8327
	For Additional MSDSs: (918) 661-5952

A. Product Identification

Synonyms: Sulfuretted Hydrogen; Hepatic Gas; Hydrosulfuric Acid
 Chemical Name: Hydrogen Sulfide
 Chemical Family: Inorganic Acid
 Chemical Formula: H₂S
 CAS Reg. No.: 7783-06-4
 Product No.: Not Established

Product and/or Components Entered on EPA's TSCA Inventory: YES

This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Hydrogen Sulfide	7783-06-4	100	10 ppm	10 ppm@

@ Short term exposure limit is 15 ppm.

C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposure below recommended levels.

Respiratory Protection: For concentrations exceeding the recommended exposure level, use NIOSH/MSHA approved air purifying respirator. If conditions immediately dangerous to life or health (IDLH) exist, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA) equipment.

Eye Protection: For splash protection use chemical goggles and

unnecessary skin contamination with material.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Proper personal protective equipment must be used when handling this chemical.

Do not get liquefied gas into eyes, on skin, or on clothing. May cause freeze burns upon direct contact. Do not breathe vapor, mist, fume or dust. May be harmful. Launder contaminated clothing before reuse. Use only with adequate ventilation. Wash thoroughly after handling.

Keep away from heat, sparks, and flames. Secure container to prevent damage. Store in a well-ventilated area. Store in tightly closed container. Bond and ground during transfer. Do not puncture or incinerate container.

Handle cylinders with care. Protect cylinders from physical damage. Containers should not be subjected to temperatures above 125F. Do not heat cylinders by any means to increase the product discharge rate. Use a check valve or trap in the discharge line to prevent backflows into the cylinders. All electrical equipment should be non-sparking or explosion proof. Test atmosphere periodically for H₂S. Do not rely on sense of smell for H₂S release. Use product in a closed system.

E. Reactivity Data

Stability: Stable

Conditions to Avoid: Heat, flame, or other sources of ignition.

Incompatibility (Materials to Avoid): Concentrated nitric acid, sulfuric acid, and other strong oxidizers. Vapors will combust spontaneously when mixed with chlorine, nitrogen trifluoride, or oxygen trifluoride vapors. Distinct hydrogen sulfide odor can be masked by high concentrations of vapors or gas of other chemicals.

Hazardous Polymerization: Will Not Occur

Conditions to Avoid: Not Applicable

Hazardous Decomposition Products: Sulfur Oxides formed when burned.

F. Health Hazard Data

Recommended Exposure Limits:

See Section B.

Acute Effects of Overexposure:

Skin: Gas not expected to be irritating to skin. Liquid may cause freeze burns, irritation, reddening or swelling.

Inhalation: Toxic by inhalation. Release of liquefied product may create atmospheres which can rapidly exceed lethal levels. Acute low level exposure that exceeds the permissible exposure limit will result in irritation of the nose and throat, headache, dizziness, nausea, and nervousness.

Ingestion: Liquid may cause freeze burns and death.

Subchronic and Chronic Effects of Overexposure:

Humans breathing up to 8 ppm of hydrogen sulfide over a two month period experienced nausea, headache, shortness of breath, sleep disturbance, eye and throat irritation.

Other Health Effects:

The odor of hydrogen sulfide may not be recognized after prolonged inhalation due to paralysis of the sense of smell. Effects from inhaling the fumes may lead to chronic bronchitis, respiratory irritation, increased loss of pulmonary function, and tearing of the eyes.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	<u> X </u>	<u> X </u>
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	<u> X </u>	<u> X </u>
Allergic Sensitizer	___	___	Specify - Skin & Eye Hazard - Freeze burns;		
Highly Toxic	___	___	Lung Hazard-Irritant; Nerve Toxin		

First Aid and Emergency Procedures:

NOTE: For freeze burns, immediately flush effected area with tap water for at least fifteen minutes, seek immediate medical attention.

Eye: Flush eyes with running water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Skin: Wash skin with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Inhalation: Immediately remove from exposure.If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.

Ingestion: If illness or adverse symptoms develop, seek medical attention.