INDEX

*Forms currently under development.

MANAGEMENT COMMITMENT & RESPONSIBILITIES

1.0 MANAGEMENT COMMITMENT & RESPONSIBILITIES

1.1 Environment, Health and Safety Policy

Harvest Operations Corp. (Harvest) is committed to conducting its operations in a manner that protects the health and safety of employees, contractors, subcontractors, the public, and the environment that we all share. Harvest will make health and safety, environmental protection a core value of all business activities from acquisition and management of its properties to final abandonment and reclamation. Harvest has developed and maintains a proactive environment, health and safety management system, that defines the key principles by which all work is conducted.

Harvest has developed and maintains a security management program that ensures the safety of the public, personnel and facilities involved in its business operations; in doing so minimizes any adverse impacts to the environment or economic conditions that might result from any security threat or incident.

Harvest strives to achieve an incident free work place. Harvest managers, supervisors, employees, contractors and subcontractors shall assess and control hazards affecting people, environment or property. Harvest employees, contractors and subcontractors are required to report hazards or unsafe conditions to their supervisor immediately. Harvest will communicate with employees, contractors and subcontractors to make them aware of hazards and of the responsibility of implementing controls. Harvest maintains effective corporate and site specific emergency response capabilities ensuring personnel are adequately trained to effectively respond to emergencies in order to protect the public, and the environment.

Harvest employees, contractors and subcontractors shall report all incidents and near miss events to Harvest management. All reports will be reviewed and investigated as required by supervisors, managers, and/ or EH&S department to determine the root cause in order to implement corrective actions, and reduce risk of future loss.

Harvest managers and supervisors shall regularly conduct inspections to assess hazard controls, working conditions, operating and maintenance practices, and regulatory compliance. Harvest and its employees, contractors and subcontractors are required to provide and maintain safe tools and equipment.

Harvest employees, contractors and subcontractors will ensure adequate training is maintained as defined in the Harvest environment, health and safety management system, master service agreements, operators agreements and consulting agreements. Harvest provides orientations, and site specific training as required.

Harvest conducts its business according to all regulatory requirements, striving to comply with both the intent and specific requirements of regulations. Compliance is the responsibility of all employees, contractors and subcontractors and is a condition of employment.

1.2 Petroleum Industry Guiding Principles

Harvest fully supports the following Petroleum Industry Guiding Principles:

We, the members of the petroleum industry, have a responsibility to protect all workers engaged in its activities from personal injury and health hazards. To meet our responsibility we will operate under the following guiding principles:

RESPONSIBILITY

The operating company, when acting as prime contractor, is responsible for coordination and general supervision of all activities at the worksite, including activities carried out by contractors, subcontractors, service companies and suppliers. While all parties have a responsibility to promote worker safety, the operating company recognizes its leadership role in promoting worker health and safety on the basis that it has the greatest power to influence worksite situations. It is the responsibility of workers and employers to refuse to perform unsafe work practices.

PRIORITY

Activities will be conducted on the basis that safety of all personnel is of vital importance, whether those personnel are employed by an operating company, a contractor, a subcontractor, a service company or a supplier.

RECOGNITION

The process of selecting contractors, subcontractors, service companies and suppliers, and the administration of contracts, will include recognition and support of good safety performance. Support and recognition based on good safety performance will also be provided by all employers to their employees.

IMPROVEMENT

The operating company, in cooperation with service companies within the industry, will promote methods and practices that have potential for improving safety performance.

1.3 Environment, Health and Safety Management System

To meet the obligations described in the environment, health and safety policy and guiding principles, Harvest has developed an integrated environment, health and safety management system. The management system is an organized and formal approach to managing environment, health and safety issues throughout Harvest operations that is founded upon continuous improvement cycle of PLAN, DO, CHECK, ACT:

Setting health, safety and environment policy is the first step in establishing the EHS Management System. The policy defines, in a broad sense, what Harvest wants to achieve and establishes environment, health and safety commitments;

PLAN

- Planning to ensure success of the policy. Planning provides the framework for establishing environment, health and safety goals and objectives, developing

strategies for achievement and allocating resources to implement strategies. Planning establishes overall direction;

DO

- Implementing programs and procedures. Implementation provides structure and delineates the roles, responsibilities, authority and accountability for accomplishing the work;

CHECK

- Monitoring and measuring to evaluate performance. Monitoring provides a mechanism to track and evaluate progress towards achievement of established objectives and targets;
- Checking for and correcting identified issues. Checking keeps the company on track relative to goals and objectives; and

ACT

- Periodically reviewing the entire system. Reviews ensure that the system continues to reflect and achieve goals and objectives over the long term.

1.3.1 Environment, Health and Safety Management System Elements

The Harvest Environment, Health and Safety Management System (EHSMS) is founded on ten program elements.

1. Management Commitment and Responsibilities
2. Hazard Identification, Risk Assessment, and Controls
3. Policies, Codes of Practices, Rules, Procedures & Guidelines
4. Orientations & Training
5. Communication
6. Incident Reporting & Investigation
7. Environmental Management Plan
8. Contractor Management
9. Emergency Response
10. Forms

1.3.2 Emergency Response Plan

Harvest's Emergency Response Plans (ERP's) are meant to protect the health and safety of workers, the public and the environment in the event of an emergency. Training and exercises in accordance with provincial regulatory agencies and applicable provincial OH&S regulations will be conducted to ensure Harvest's response to any emergency will be prompt, organized, and effective.

Refer to the Harvest corporate ERP for a complete description of roles and responsibilities.

1.3.3 Enforcement

Harvest environment, health and safety policies, codes of practices, rules, procedures and guidelines represent minimum requirements and must be enforced. Compliance with the Harvest EHSMS is enforceable under the Harvest Employee Discipline Policy. The Employee Discipline Policy specifically includes the violation of safety policies, codes of practices, rules, procedures and guidelines as a trigger for disciplinary action, up to and including termination of employment. This policy can be found on the Harvest Intranet site in the HR Policies section.

The following must be considered when enforcement actions are required:

- Ensure employees are aware of regulations and procedures
- Ensure employees are not encouraged, coerced, or forced to disregard safety policies, codes of practices, rules, procedures and guidelines by fellow employees or supervisors
- If policies, procedures, practices, rules or guidelines are disregarded, it must be documented on the Job Observation Checklist
- The preferred role of discipline is that of education; by on the job coaching and work site observations
- Ensure action is taken promptly and privacy is respected
- Allow flexibility since each case will vary in its circumstances
- Ensure enforcement action is documented

1.3.4 EHSMS Administration

It is the responsibility of the EHS department with support from senior management to coordinate the development, implementation and maintenance of the EHSMS. The following points will guide the administration of the EHSMS:

- The EHSMS will be available in an easy to use and readily accessible format
- The EHSMS expectations are based on regulatory requirements and accepted industry practices
- Employee input is integral to the EHSMS. The opportunity for employees to provide input encourages support of the EHSMS
- All employees, contractors and subcontractors will receive orientations based on their roles and responsibilities
- The EHSMS is a “living document”. The management system will be revised and updated as regulations, industry standards or Harvest operations change
- In addition to the EHSMS, copies of current environment, health and safety legislation will be maintained and accessible

1.3.5 Authority to Proceed with Work

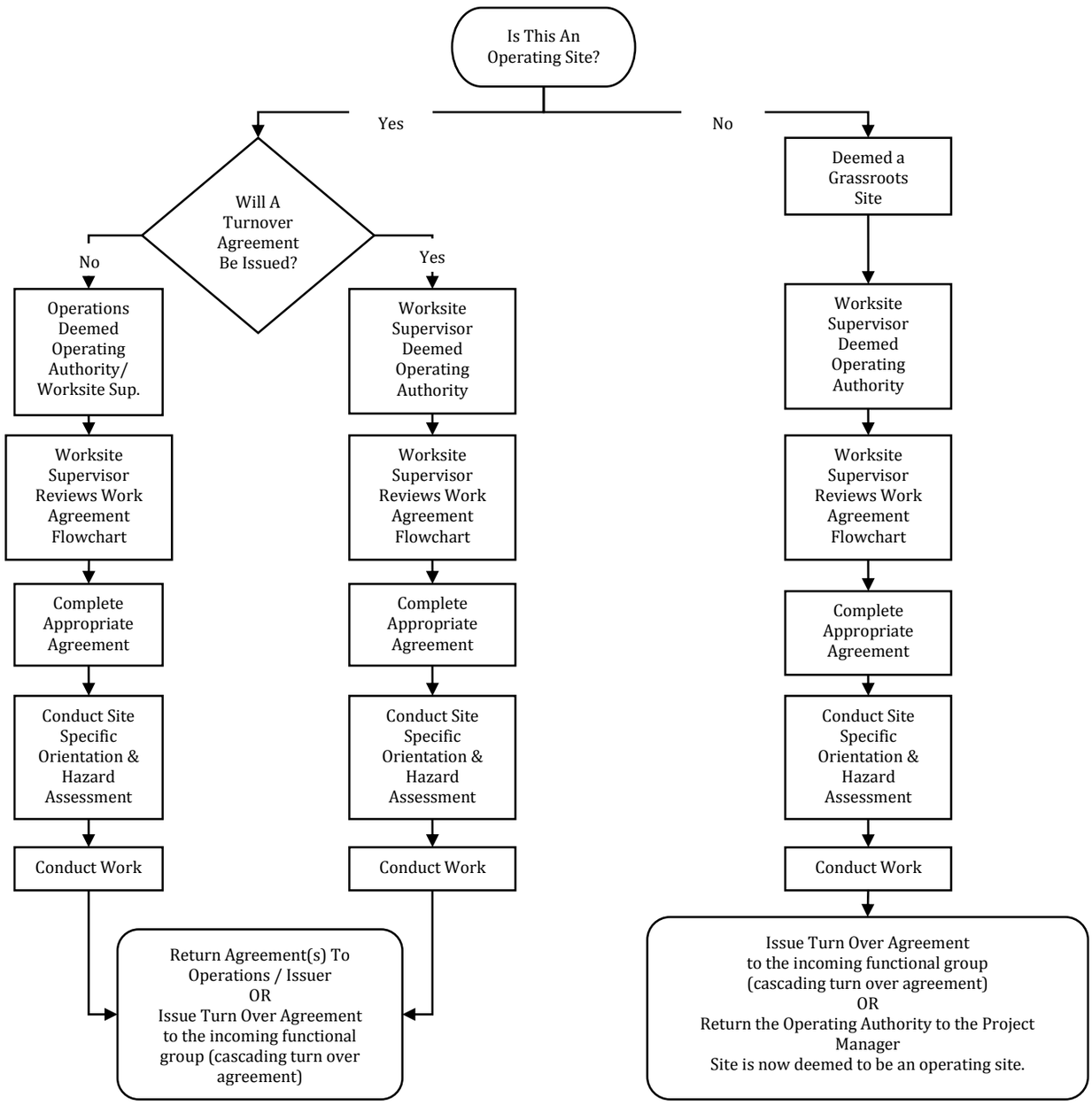
All work on Harvest properties must be authorized by the Operating Authority. The chain of authority flows from the executive through management and supervisors to workers. The Operating Authority is the individual to whom Harvest has delegated immediate control and accountability for all operations on a specific work site.

The Operating Authority may issue authority to proceed with work to a Performing Authority. The Operating Authority will determine the conditions and documentation under which the Performing Authority may proceed with the work. Issuing authority to proceed with work may take several forms, such as:

- Delegation or assignment of authority and responsibility via job description and deemed competency. An Example is authority and responsibility that is assigned by an Area Superintendent to a Foreman, Lead Operator, or Production Operator. These individuals are pre-authorized to perform, delegate or authorize certain work.
- Construction packages, work over or drilling programs assigned to a Worksite Supervisor must be accompanied by a Notice of Worksite Supervisor form (only required in Saskatchewan; optional in Alberta and British Columbia).
- Specific and restrictive written authorization will be assigned to a worksite supervisor via a Safe Work Agreement (turnover). The Safe Work Agreement will specify the location, scope of work and conditions by which the authority is granted.
- Authorization to proceed with the work may be granted verbally as per the Safe Work Agreement process.

The Process to Determine Operating Authority (Worksite Responsibilities) flowchart will assist in appropriately identifying and documenting the chain of authority.

Process to Determine Operating Authority (Worksite Responsibilities)



10 Key Principles

1. Identify the Harvest Operating Authority
2. Acquire authority to proceed with work
3. Identify and document names of Worksite Supervisor and alternate
4. Identify scope of work, list tasks (stop work if scope changes
5. Assess competency for the tasks at hand
6. Identify hazards (including those related to concurrent work) and assess risk
7. Identify risk controls and assign any required actions
8. Ensure compliance with regulations
9. Plan Site Emergency Response (contacts, muster areas etc.)
10. Review with all workers and document

Definitions:

- Operating Site - Operating facility on site (well, satellite, SWB, tied into another facility, etc). Once a site has attained "Operating" status it cannot revert to grassroots.

  NOTE: a site that is in the reclamation stage the operating authority will be permanently assigned to the Environment

Grassroots - New lease, no operational facility on site, has not been turned over to operations yet

1.3.6 Ten Key Principles

A number of tools such as procedures, guidelines, codes of practice and forms have been developed to assist workers in complying with the Harvest EHSMS and regulatory requirements. Supervisors and workers are encouraged to reference and utilize these tools, however each site and situation is unique and all tools may not always be applicable or readily available. Harvest has defined 10 Key Principles that must be followed in all situations for all work that is to be conducted at all Harvest work sites. The objective of the 10 Key Principles is to ensure all activities are conducted in a safe and responsible manner regardless of the applicability and availability of specific tools.

1. Identify the Harvest Operating Authority
2. Acquire authority to proceed with work
3. Identify and document names of Worksite Supervisor & alternate
4. Identify scope of work, list tasks, (stop work if scope changes)
5. Assess competency for the tasks at hand
6. Identify hazards (including those related to concurrent work) and assess risk
7. Identify risk controls and assign any required actions
8. Ensure compliance with regulations
9. Plan Site Emergency Response (contacts, muster areas, etc.)
10. Review with all workers and document

1.4 Environment, Health & Safety Responsibilities

1.4.1 Senior Management

- Ensure that an effective EHSMS is developed, implemented in all departments and updated as required. This will include current emergency response plans, policies, codes of practices, rules, procedures and guidelines.
- Demonstrate commitment and encourage employees, contractors and subcontractors involvement by communicating regularly on the importance of safe and environmentally responsible operations.
- Ensure that the EHSMS and all company operations comply with regulations and industry standards.
- Set expectations for employees, contractors and subcontractors performance in environment, health, and safety.
- Establish performance measures and monitor to ensure that environment, health, and safety expectations are met.
- Determine performance levels through audits.
- Visit field sites at regular intervals to conduct worker observations and inspections.

1.4.2 Superintendents & Managers

- Set performance expectations to ensure that the EHSMS is effectively implemented in all departments and that company operations comply with regulatory requirements.
- Regularly review performance of the EHSMS.
- Insist on and enforce performance and behavior that meets the standards of the EHSMS.
- Ensure that training needs are identified and workers are competent to perform their tasks.
- Ensure hazards are identified, assessed and controlled.
- Ensure adequate preventative maintenance programs are developed and implemented.
- Ensure that emergency response plans are updated regularly and that exercises are conducted as required.
- Ensure that all incidents are reported, investigated, and that corrective actions are implemented.
- Screen, hire and manage contractors and subcontractors according to the Harvest contractor engagement requirements.
- Visit field sites at regular intervals to conduct worker observations and inspections and ensure compliance to company, industry and regulatory requirements.
- Ensure inspection deficiencies are properly identified, assessed and corrected.
- Ensure that Worksite Supervisors receive appropriate environment, health and safety orientations.
- Ensure effective use of the Safe Work Agreement System.
- Review the Due Diligence Checklists. Ensure all due diligence obligations have been documented and completed before hiring the company.

1.4.3 Foremen & Supervisors

- Ensure workers understand the EHSMS and their safety responsibilities, whether it is Harvest's program or the contractor's program.
- Encourage workers to provide input into the EHSMS development, implementation and updating.
- Ensure that appropriate orientations are conducted and recorded for all new or transferred workers.
- Ensure appropriate safety equipment including PPE (personal protective equipment) is readily available, used and well maintained.
- Review applicable policies, codes of practices, rules, and procedures & guidelines with all workers and enforce compliance.
- Ensure that copies of all applicable regulations and guidelines are available at the worksite and that operations are conducted according to regulations.

- Inform workers of their responsibility to identify unsafe conditions or activities and to refuse unsafe work.
- Ensure workers understand Harvest's discipline, harassment and violence policies and carry out appropriate enforcement as required.
- Ensure identified training requirements are met for all workers.
- Ensure regular safety meetings are conducted and that recommended actions are implemented.
- Ensure that hazards are identified, assessed and controlled before work proceeds.
- Ensure workers are informed of the worksite hazards and participate in hazard assessment and control identification.
- Ensure that SDS's (safety data sheets) are available for each hazardous product that is brought on-site or produced and that workers are aware of them.
- Ensure workplace labels are attached to all hazardous material containers as per WHMIS (workplace hazardous material information system) regulations.
- Maintain a Preventive Maintenance Program for equipment, machines, vehicles, tools, safety equipment and personal protective equipment.
- Ensure that effective emergency response exercises are conducted.
- Ensure workers report all incidents and support incident investigation to ensure corrective actions are taken.
- Participate in regular worksite inspections to identify, assess and correct deficiencies.
- When hiring a Worksite Supervisor, the Harvest Supervisor must:

1. Point out Harvest's commitment to Environment, Health and Safety and gain agreement from the Worksite Supervisor that he or she will conduct our business accordingly.
2. Assess competency of the Worksite Supervisor, and verify qualifications and training certifications.
3. Review the responsibilities of the Worksite Supervisor listed in this section.
4. Ensure the Worksite Supervisor obtains access to the Harvest Environment, Health & Safety Management System:

    - EHSMS Flash drive
    - Harvest Intranet - http://intranet/departments/ehs/#Overview
    - Harvest Website - http://www.harvestenergy.ca/
    - Operations Tablet

5. Review the EHSMS table of contents with the Worksite Supervisor
6. Establish an expectation that all incidents will be immediately reported to the Harvest Supervisor and the EHS department.
7. Provide the Worksite Supervisor with a list of Harvest Emergency Contacts.

8. Ensure the Worksite Supervisor completes all required Harvest orientations.
9. Provide the Worksite Supervisor with documents detailing what work he or she is to supervise. This may be a construction package, a work-over or drilling program, etc. This must include a Notice of Worksite Supervisor form (only required in Saskatchewan; optional in Alberta and British Columbia).
10. Direct the Worksite Supervisor to ensure that the Notice of Worksite Supervisor form is signed by all contractors and subcontractors and is kept on the worksite (only required in Saskatchewan; optional in Alberta and British Columbia).
11. Direct the Worksite Supervisor to contact the Area Foreman prior to commencing work.
12. Confirm or arrange for a Master Services Agreement (MSA) with the Harvest Procurement Group.
13. Ensure the Worksite Supervisor utilizes the contractor engagement system when hiring contractors and subcontractors
14. (www.complyworks.com)
15. Confirm appropriate Insurance and WCB coverage for the applicable province.
16. Review the Due Diligence Checklists with the Worksite Supervisor. Ensure all due diligence obligations have been reviewed and understood by the Worksite Supervisor.

1.4.4 Environment, Health and Safety Advisors

- Actively participate in EHSMS development, implementation and maintenance.
- Assist in effectively integrating EHSMS guidelines, procedures and resources throughout Harvest operations.
- Provide guidance regarding regulatory requirements.
- Promptly respond to EHSMS issues as they may arise.
- Guide and assist supervisors in managing environment, health and safety records.
- Monitor environment, health and safety performance and facilitate achievement of targets.
- Support, advise and facilitate in hazard identification, risk assessment and control.
- Identify and assist in correcting unsafe acts and conditions.
- Support, advise and evaluate use of the work agreement system.
- Participate in regular inspections/audits and any identified deficiencies are properly assessed and controlled.
- Provide guidance regarding emergency response procedures.
- Participate in emergency response exercises.
- Verify that emergency response plans are updated regularly.

- Monitor and recommend training requirements for compliance and accuracy.
- Conduct or assist in environment, health and safety orientations.
- Participate in pre-job and regular safety meetings.
- Encourage and facilitate discussion of EHSMS issues.
- Lead or participate in incident investigation.

1.4.5 Worksite Supervisor

- Worksite Supervisors must be easy to locate and contact at all times.
- Assign an Alternative Worksite Supervisor to be contacted if the Worksite Supervisor becomes incapacitated or inaccessible for any reason.
- Ensure that the Notice of Worksite Supervisor form is signed by all contractors and subcontractors and is kept on the worksite (only required in Saskatchewan; optional in Alberta and British Columbia).
- Ensure that all workers and visitors receive the Site Specific Orientation & Hazard Assessment onsite before conducting work.
- Check that all workers have completed the Enform - Electronic General Safety Orientation (eGSO)
- Make sure that all contractors (use direct contractor information for subcontractors) maintain full compliance on the contractor engagement system when conducting work (www.complyworks.com).
- Check that all workers on the worksite have an effective safety program and safe work procedures.
- Check that all workers understand and agree to follow all requirements in the Harvest EHSMS that are not already met by their own program.
- Issue safe work agreements.
- Co-ordinate the efforts of all workers at the work site. Resolve any discrepancies between safe work procedures before starting the work.
- Identify and document the name of the on-site supervisor for each employer prior to starting any work.
- Review and clarify the roles and responsibilities of all workers and on-site supervisors prior to doing any work.
- Check that all employers on site are providing their employees with the training and supervision described in the Contractors' and Subcontractor's responsibilities.
- Ascertain the number of inexperienced workers and review job execution plans with the employer to ensure these workers receive adequate supervision.
- Identify hazards related to the specific worksite, the planned program or the materials provided by Harvest. Inform all employers' supervisors of these hazards and ensure proper controls are in place before the work begins.
- Establish and co-ordinate site-specific emergency response procedures. Post information, review procedures and conduct practice drills with all personnel on site.

- Monitor the work performed by all employers to verify compliance with safety legislation.
- Monitor the worksite for proper use, handling, storage and maintenance of personal protective equipment by all workers.
- Check that the procedures for handling, transportation, disposal, storage and use of all hazardous substances, follows applicable regulations and safe practices.
- Implement detection and control of Hydrogen Sulphide and other hazardous gases to prevent harmful exposure of workers or the public.
- Implement detection and control of any flammable substances that may be emitted from the worksite or surface facilities, to prevent accidental fire or explosion.
- Direct work to be stopped when an unsafe act or condition is identified. Resume work only after the hazard is removed or safe procedures have been established.
- Ensure all incidents are reported to Harvest and investigated.
- Ensure work site inspections are regularly conducted and any identified deficiencies are adequately assessed and controlled.
- Harvest has a due diligence checklist to assist Worksite Supervisors in managing their due diligence obligations. Refer to the Due Diligence Checklists.

1.4.6 Contractors' and Subcontractors’

- Ensure that their employees have completed the Enform - Electronic General Safety Orientation (eGSO).
- Provide documentation that shows valid insurance/liability coverage that meets the requirements of Harvest.
- Inform employees of their responsibilities to identify and refuse unsafe work and ensure work is safe to perform before resuming any activities.
- Report all accidents, incidents, and near miss events to Harvest management.
- Review all applicable legislation with employees that may affect their jobs.
- Ensure employees are competent to perform their job safely and efficiently.
- Provide employees with proper job instruction and training to safely perform the task at hand.
- Ensure new employees receive direct supervision by a competent employee until they have demonstrated the ability to perform the assigned tasks safely and efficiently.
- Ensure only properly trained employees operate equipment or machinery.
- Ensure proper PPE (personal protective equipment) is available, utilized by all personnel and properly maintained.
- Conduct frequent inspections of the worksite to ensure employees are following safe work practices and applicable regulations.

- Have an effective environment, health and safety program and ensure employees are aware of the requirements of the program.
- Inform employees of the penalties for violating regulatory requirements.
- Ensure employees identify hazards and inform supervision of the hazards and help with developing controls to eliminate or reduce the risk.
- Ensure that employees comply with all environment, health, & safety standards; including Harvest's.
- Ensure all hazardous materials brought on site are identified and reviewed with all employees and the applicable SDS's are available.
- Ensure that Site Specific Emergency Response Plans are in place, that employees are familiar with them and will follow the plan in an emergency.

1.4.7 Workers'

- Become thoroughly familiar with their employer's environment, health and safety program.
- Actively participate in environment, health and safety program development and maintenance.
- Attend and actively participate in all pre-job, tailgate and general safety meetings.
- Follow environment, health and safety standards and safe work procedures set out by the employer and regulatory requirements.
- Participate in hazard identification, assessment and control.
- Refuse to perform work when unsafe conditions exist (as defined in Provincial occupational health and safety legislation).
- Refuse to perform work when they are not competent to perform the task.
- Immediately report potential hazards to supervisors.
- Immediately report all incidents to supervisors.
- Participate in all training offered by the employer.
- Use required personal protective and safety equipment.
- Check tools and equipment, including personal protective and safety equipment for hazards before using them.
- Know the location, type and operation of emergency equipment.
- Participate in the work agreement system.

1.4.8 Visitors'

- Check in with Worksite Supervisor responsible for the location and obtain permission to enter.
- Follow the instructions of the Worksite Supervisor.
- Wear personal protective equipment as required.
- Never enter a site without permission or unescorted.

1.5 Right to Refuse Unsafe Work (All Workers)

1.5.1 What is Unsafe Work?

Most occupations involve some risk at work and in a broader sense, this constitutes a danger. Unsafe work (imminent danger) has been defined in the Alberta Occupational Health and Safety Act as:

a. A danger that is not normal for that occupation, or
b. A danger under which a person engaged in that occupation would not normally carry out the person's work.

1.5.2 What Must the Worker Do?

When a worker has reasonable grounds to suspect that the work is unsafe (imminently dangerous), the worker must:

a. Stop all work for that procedure,
b. Immediately inform the site supervisor/representative of the specific concern, and
c. In the event the worker disputes the on-site supervisor's findings, management will conduct an independent investigation. If the worker also disputes the management's investigation, then the appropriate OH&S agency will be contacted to adjudicate the issue.

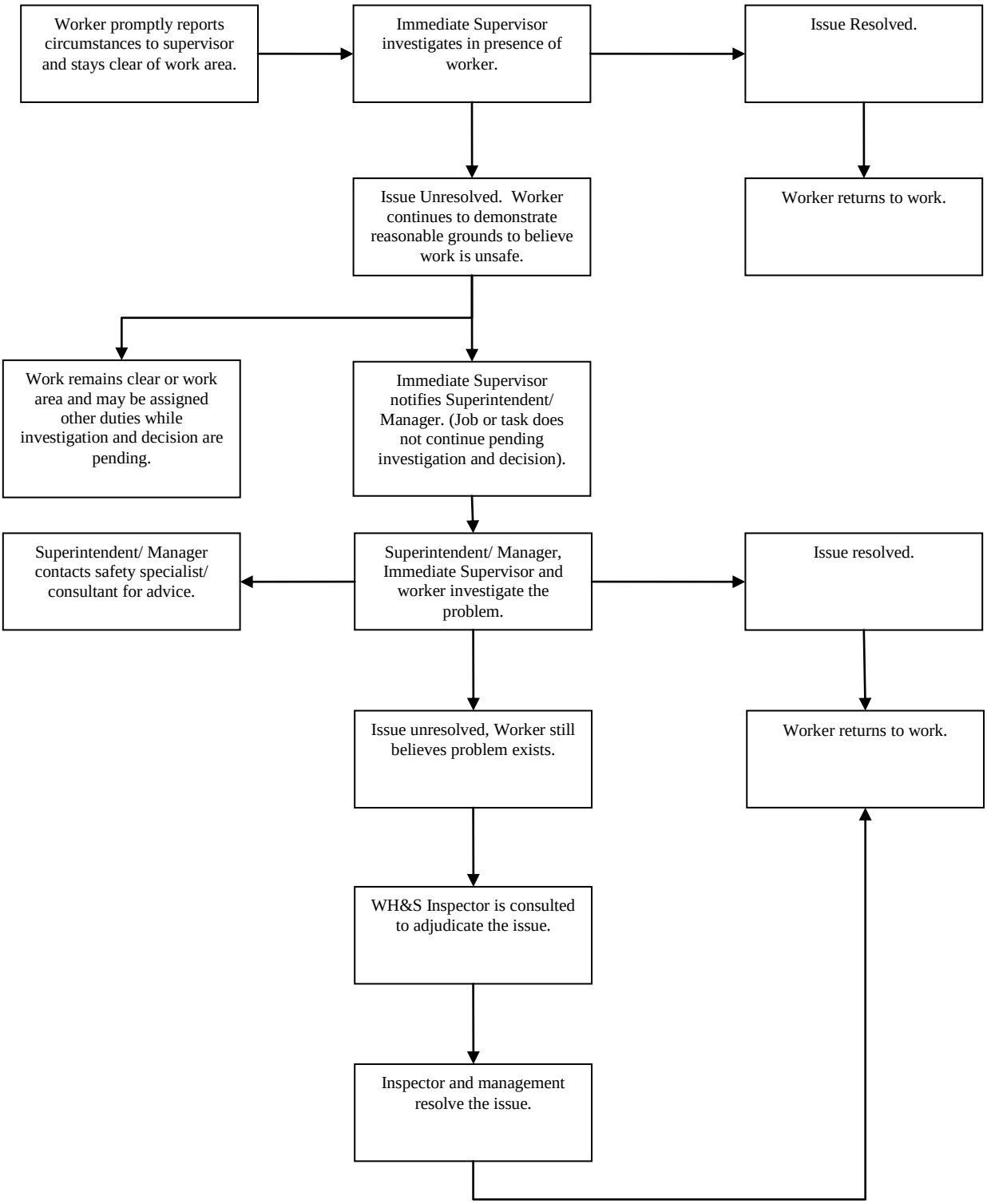
1.5.3 What Must the On-Site Supervisor Do?

When a worker has refused work they feel is unsafe (imminently dangerous) the on-site supervisor/representative must:

a. Stop all work for that procedure,
b. Investigate the cause for the worker's concern, report his findings to the worker(s), and take corrective action before work resumes. If the investigation reveals, in the on-site supervisor's opinion, that no hazard exists then the on-site supervisory must report to the worker the reasons for his opinion,
c. Notify management immediately if the dispute continues between the on-site supervisor and the worker(s). Management will investigate and report their findings to the worker(s) and the on-site supervisor,
d. Notify the applicable OH&S government agency for adjudication if a dispute remains unresolved after the management's investigation, and
e. Do not discipline the worker in any fashion. The on-site supervisor may request the worker to carry out other duties during the investigation. The on-site supervisor may not request other employees to carry out the potentially dangerous task without a full investigation.

All Workers have the right, responsibility, and obligation to refuse unsafe work.

1.5.4 Refusal to Work Flow Chart



HAZARD IDENTIFICATION, RISK ASSESSMENT & CONTROL

2.0 HAZARD IDENTIFICATION, RISK ASSESSMENT & CONTROL

2.1 Policy

Hazard identification, risk assessment and controls are the shared responsibility of all personnel and must be considered at several stages throughout the life cycle of all business activities, including but not limited to:

Design Phase: The Project Manager is responsible to ensure that a process hazard assessment (PHA) is conducted to identify hazards and necessary controls to be included in the design.

Construction and/or Development Phase: During construction and/or development, any changes or deviations from the original design must follow the Harvest Management of Change procedure to ensure that additional hazards are identified, assessed and controlled.

Commissioning and/or implementation: Prior to commissioning, an operational readiness review must be performed to ensure all hazards have been identified and adequate controls and safety equipment are installed and ready for operation.

Normal operation: At any time hazards are identified they must be formally documented as per reporting procedures. Whenever hazards have not been previously identified work must stop. Hazards must then be assessed and controlled prior to work restarting.

Non-routine work: When new, unusual or high-risk work is to be done, the identification, assessment and control process must be used, prior to commencement of work.

Concurrent work: The Worksite Supervisor must ensure that hazards are identified, assessed, controlled and communicated to all parties.

Modifications: Workers must immediately notify their supervisor when changes or modifications are planned. The management of change procedure must be followed.

2.2 Introduction

This section describes Harvest's process for hazard identification, risk assessment and control. Hazard identification, risk assessment and control is essential in preventing injuries, major property or production losses, impacts to the public, or damage to the environment. Harvest has developed a systematic approach for identifying hazards associated with a particular task, job or worksite and implementing appropriate controls to reduce risk to acceptable levels.

2.3 Training

Personnel involved in hazard identification, risk assessment and control will be competent and have an appropriate level of understanding of the work they are assessing. They will have the authority to direct or conduct the work. If required the assessment team may be comprised of various disciplines and subject matter experts.

Personnel will be provided with Harvest – Hazard ID, Risk Assessment & Control Training via ComplyWorks.

2.4 Process

Hazard identification, risk assessment and control is a major component of the 10 Key Principles and is essential in ensuring activities are conducted in a safe and responsible manner. Harvest has developed numerous techniques and tools for conducting hazard identification, risk assessment and control. Specific tools should be utilized when applicable; however the basic process for identifying hazards, assessing risk and implementing controls must be completed in all situations for all work that is to be conducted at all Harvest worksites. The general process must include the following steps:

1. Define the scope of work to be assessed
2. Identify hazards associated with the work
3. Assess the risk associated with the hazards
4. Identify and implement controls required to reduce the risk

The following tools should be used, when applicable, to facilitate the hazard identification, risk assessment and control process:

- **Safe Work Agreement:** The safe work agreement is designed to assist in identifying, controlling and communicating hazards associated with a specific area or task. There are primarily four types of safe work agreements:

    - Turnover
    - Cold Work
    - Hot Work
    - Term

  Safe work agreements involve completing a site specific orientation & hazard assessment for the specified scope of work. The results of the site specific orientation & hazard assessment are reviewed and communicated daily to the work crew conducting the work.

- **Safety Meetings:** Safety meetings provide an opportunity for all workers to identify and discuss hazards and/or unsafe work practices. There are primarily two types of safety meetings: pre-job safety meetings and regular safety meetings. Safety meeting minutes can be used to track progress in implementing controls.

- **Policies, Codes of Practices, Rules, Procedures & Guidelines:** Harvest has developed a number of policies, codes of practice, rules, procedures and guidelines to address hazards that are typical throughout Harvest operations. These generic procedures provide guidance in identifying more specific hazards and implementing controls.
- **Manufacturer's Operating Manual:** When procuring, installing, maintaining and/or operating equipment refer to manufacturer's specifications.
- **Critical Tasks:** Harvest has developed and regularly updates an inventory of critical tasks. Harvest supervisors are responsible for identifying critical tasks that are performed in their area of control. Critical tasks generally include:

    - those where frequent incidents occur,
    - those where severe incidents or injuries occur,
    - those with potential for severe incidents or injuries,
    - new or modified jobs, and
    - Unusual or infrequent tasks.

A job safety analysis must be completed for each critical task identified.

- **Job Safety Analysis (JSA):** JSA's are conducted to identify hazards, assess risk and assign hazard controls for critical tasks and new/unusual work. JSA's will be completed by an assessment team that includes a worker who has experience performing the task that is being assessed. Generally, the JSA process involves:

    - List the job into a sequence of steps,
    - Identifying the hazards associated with each step,
    - Evaluating the risk for each hazard,
    - Identifying required risk controls,
    - Re-evaluating the risk with additional controls in place, and
    - Defining specific safe work procedures that include preventative measures.

JSA's must be reviewed and approved by the area supervisor. The approved JSA and associated procedures must be posted and/or made readily available to the affected workers and should be used in training and competency evaluation. JSA's should be reviewed and updated periodically.

- **Hazard and Operability (Haz Ops):** Potential hazards related to design; construction and operations must be considered via a thoughtful and structured process. To facilitate this Harvest has developed a formal Hazard & Operability process.

- **Management of Change Procedure:** Potential hazards related to changes to systems, equipment, procedures, materials, products, or chemicals must be assessed before the changes can be completed. Harvest has developed a Management of Change (MOC) procedure to assist in assessing, ranking and controlling hazards associated with change.
- **Regular Inspections:** Regular inspections assist in ensuring regulatory compliance and evaluating the effectiveness of the Harvest EHSMS. Inspections also provide an opportunity to identify and address hazards.
- **Incident Reporting and Investigation:** Incident reporting and investigation assists in identifying and control hazards and deficiencies that have not previously been adequately addressed. It is important to report near misses and hazards so that they can be assessed and controlled before a more serious incident occurs.

2.5 Scope of Work

The first step in conducting hazard identification, risk assessment and control is to identify the scope of work. The scope of work may include one specific task, a job comprised of multiple tasks, a work site comprised of multiple jobs or an area comprised of multiple work sites. The scope of work must be clearly defined and understood to ensure all associated hazards are adequately addressed. Large scopes of work should be broken down into smaller job components. Preparing a rough procedure of the work may assist in identifying the individual steps within the scope of work. The generic procedures contained in Rules, Codes of Practice and Guidelines and Manufacturer's specifications shall be used for reference. If the work scope and/or conditions change, the work must be stopped, the hazards and risks reassessed and controls implemented in order for work to proceed. This process must be documented.

2.6 Hazard Identification

Hazards may be identified through past experiences, conducting a visual inspection of the work area, reviewing incident reports and safety alerts, discussion with workers and/or subject matter experts, observing a worker performing a task, Manufacturer's specifications etc. It is important to be thorough and consider all possibilities.

The following examples of potential hazards may provide further assistance in identifying hazards:

- **Mechanical / Physical:** Such as being struck by or being caught in rotating, reciprocating or transverse motion of machinery
- **Falling:** including falling while wearing fall protection harness.
- **Ergonomic:** Relating to the interactions of man, machine and repetitive motions.
- **Chemical:** Any toxic substance(s). Exposure may be acute or chronic; may be in the form of a liquid, solid or gas; and may enter the body by inhalation, absorption, injection or ingestion. This also includes any substance that creates an explosive, flammable or oxygen deficient atmosphere.

- **Electrical:** Any type of energy that could potentially send a current through the body, or create a voltage potential difference between a person and another structure with the potential of discharge.
- **Biological:** Any biological agent that causes adverse effects to the human body, such as bacteria, viruses or fungi.
- **Radiation:** Can be “non-ionizing” (includes microwaves, radio waves, ultraviolet, or infrared) or “ionizing” (includes gamma rays, X-rays and radioactive materials).
- **Environmental:** Any type of condition created by the surroundings or atmosphere that will affect the function of the body, such as heat, cold, humidity, noise, or air quality.
- **Acts and Behaviors of People:** Where standards exist and an individual person or persons do not act in accordance with the standard.
- **Violence:** Workplace violence must be considered a hazard.

2.7 Risk Assessment

Having identified the hazards, the next step is to assess and quantify the risks associated with the hazards. There are four steps involved in risk assessment:

1. Determine and rank the potential severity of a resulting accident as if no preventative measures or controls were introduced.
2. Determine and rank the probability that the hazards or conditions will result in an accident if no preventative measures or controls are implemented.
3. Determine the risk level based on the potential severity and probability determined in steps 1 and 2, respectively.
4. Assign a risk ranking of low, medium or unacceptable and determine whether additional controls are required.

Risk ranking matrices are provided below to standardize the risk assessment process and to provide consistent and predictable controls. The risk ranking matrices are not a substitute for experience.

Risk Assessment Steps

		Step 1 Determine Severity Category			
		People	**Environment**	**Financial**	**Public**
Severity Rating	**Unacceptable**	Lost time Injury, permanent disability or fatality	Major impact to streams, groundwater, etc. reportable to regulators	Damage or loss $500K or more, downtime 1 month or more	ERP Level 3 Emergency, National attention, shelter in place or evacuation of multiple residences
	High	Medical treatment or restricted duty	Off lease or with adverse effect. Reportable to Regulators	Loss between $50K - $500K, downtime 1 week to 1 month	ERP Level 2 Emergency, Provincial attention, warnings issued to public
	Medium	First Aid Injury	On lease but reportable to regulators	Damage or loss from $1000 to $50K, down time 1 day to a week	ERP Level 1 Emergency, Local concern or complaint from public
	Low	No foreseeable injury	On lease release but not reportable to regulators	Damage or loss up to $1000, down timeless than 1 day	ERP Alert Level No impact to public

Step 2 Determine Probability			
Remote	**Possible**	**Probable**	**Expected**
Remote chance – not expected to occur in Harvest's operations. Isolated occurrences in industry	Possibility of rare incidents. One occurrence possible in Harvest's operations in 10 years	Probable to occur. One occurrence probable in Harvest's operations in 2 years	Repeated occurrence expected. One or more occurrences per year in Harvest's operations

		Step 3 Determine Risk Probability			
		Remote	**Possible**	**Probable**	**Expected**
Severity Rating	**Unacceptable**	**M**	**U**	**U**	**U**
	High	**L**	**M**	**U**	**U**
	Medium	**L**	**L**	**M**	**M**
	Low	**L**	**L**	**L**	**L**

Step 4 Assign Risk Ranking	
U	**Unacceptable** – Work must not proceed – or if ongoing; must stop immediately until hazard controls are implemented to reduce risk to a low level.
M	**Medium** – Must implement hazard controls to reduce hazard to a low level.
L	**Low** – Some hazard control may still be justified.

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2.8 Controls

The final stage of the process is to identify, assign and implement controls for the hazards identified. The purpose is to reduce the risk level to low.

Types of controls that can be implemented include:

- **Engineering Controls:** Engineering controls are the preferred type. Hazards are eliminated or controlled by changes to equipment, process controls, guards, barriers, ventilation, material selection etc.
- **Administrative Controls:** Procedural controls are the second choice. Hazards are controlled by enforcement of rules, development of procedures, codes of practice, training, scheduling etc.
- **Personal Protective Equipment:** When Engineering and Administrative controls do not effectively mitigate the hazard to an acceptable level personal protective equipment must be used.

2.9 Implementation

Once identified and deemed adequate, risk controls must be assigned and implemented, controls must be in place before work can proceed. These controls for should be documented and progress should be monitored to ensure completion.

2.10 Review and Documentation

A documented review of the Site Specific Orientation & Hazard Assessment must be completed with the workers involved in the job prior to the commencement of work. Review and documentation may be accomplished in several ways, including work agreements, safety meeting minutes and completed JSA's.

An employer must ensure that the hazard assessment is repeated:

- at reasonably practicable intervals to prevent the development of unsafe and unhealthy working conditions,
- when a new work process is introduced,
- when a work process or operation changes, or
- before the construction of significant additions or alterations to a work site.

POLICIES, CODES OF PRACTICES, RULES, PROCEDURES & GUIDELINES

3.0 POLICIES, CODES OF PRACTICES, RULES, PROCEDURES & GUIDELINES

- 3.1 Corporate Policies
- 3.2 Codes of Practices
- 3.3 General Rules
- 3.4 Safe Operating Procedures
- 3.5 Safe Work Guidelines
- 3.6 Critical Tasks

CORPORATE POLICIES

1.0 CORPORATE POLICIES

1.1 Overview of Corporate Policies

Harvest develops and maintains policies that outline expectations for performance and behaviour. Policies set guidelines for how Harvest will conduct business. Certain policies influence the implementation of Harvest's Environment, Health and Safety Management System (EHSMS). These policies are:

- Environment, Health and Safety Policy
- Employee Discipline Policy
- Discrimination and Harassment Policy
- Violence Policy

1.2 Environment Health and Safety Policy

The Environment, Health and Safety Policy defines Harvest's commitment to the protection of the health and safety of employees, contractors, subcontractors, the public, and the environment that we all share.

1.3 Employee Discipline Policy

The Employee Discipline Policy specifically includes the violation of safety rules as a trigger for disciplinary action, up to and including termination of employment. This policy can be found on the Harvest Intranet site in the Corporate Info - Policies.

1.4 Discrimination and Harassment Policy

The Discrimination and Harassment policy sets expectations for a respectful work atmosphere. Safe work practices will flourish in an atmosphere of respect and open communication free from fear of reprisal or ridicule. This policy can be found on the Harvest Intranet site in the Corporate Info - Policies.

1.5 Violence in the Workplace Policy

Harvest Operations Corp. believes in the prevention of violence and promotes a violence free workplace in which all people respect one another and work together to achieve common goals. Any act of violence committed by or against any worker or member of the public is unacceptable conduct and will not be tolerated.

In accordance with Harvest's violence in the workplace safe operating procedure, Discrimination and Harassment Policy and Employee Discipline Policy, we are committed to:

a) investigating reported incidents of violence in a confidential, objective and timely manner;
b) taking necessary action to prevent reoccurrence; and
c) providing appropriate support for victims.

No action shall be taken against an individual for making a complaint unless the complaint is made maliciously or without reasonable and probable grounds. No employee or any other individual affiliated with this organization shall subject any other person to violence.

Acts of violence can take the form of physical contact. Abuse in any form erodes the mutual trust and confidence that are essential to Harvest's operational effectiveness. Acts of violence destroy individual dignity, lower morale, engender fear, and break down work unit cohesiveness.

Acts of violence may occur as a single event or may involve a continuing series of incidents. Violence can victimize both men and women, and may be directed by or towards Harvest's workers, visitors and members of the public.

1.6 Fit for Work Policy

The health and safety of its prospective and current Employees and protecting Workers from injury and occupational illness is of paramount importance to Harvest. Harvest has established this Fitness for Work Policy (the "Policy"), including Alcohol & Drug (A&D) Guidelines and Fatigue Management Guidelines, in order to manage workplace hazards and reduce the risks associated with impairment on the job. In accordance with this Policy and Guidelines incorporated herein, Harvest will take every reasonable precaution to provide a safe and efficient work environment for all Workers on Harvest Premises, while ensuring individuals are treated fairly and with respect.

Harvest recognizes that impairment caused by fatigue, stress, alcohol and drug misuse or abuse by Workers on Company Premises, or other sources can adversely affect job performance, the work environment, and the safety of Harvest Employees, contractors, customers and the general public. Such impairment can also negatively impact the environment and both private and public property.

Harvest recognizes that hazards and risks associated with fatigue, stress and impairment differ in the corporate environment as compared to worksites designated as Safety Sensitive Work Locations and the Guidelines established in accordance with this Policy reflect such understanding. This policy can be found on the Harvest Intranet site in the Corporate Info - Policies.

CODES OF PRACTICES

3.2 CODES OF PRACTICES

***Forms currently under development.**

ASBESTOS

1.0 ASBESTOS

1.1 Introduction

The Asbestos Code of Practice (COP) is to fulfill regulatory requirements for asbestos and to provide Harvest with guidance for controlling asbestos exposure levels to as low as reasonably achievable and below permissible limits at all times.

The Asbestos COP provides guidance to all Harvest workers and contractors and encompasses all Harvest activities.

Note: The assessment and collection of suspected asbestos will be conducted by approved contractors who are competent, and specialize in this type of work and have a quality control program with approved procedures.

1.2 Definitions

Asbestos: A collective name given to a number of naturally occurring hydrated mineral silicates. These silicates are incombustible in air, are separable into fibres, and have a unique crystalline structure. These fibrous minerals were once widely used in industry as insulation because of their fire-resistant and high-temperature stability. The most commonly used types of asbestos are named chrysotile, amosite, crocidolite and tremolite.

Asbestos-Containing Materials (ACM): Any material analyzed and found to contain 1% or more asbestos.

Competent: Adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

1.3 Identification of Bulk Asbestos

Asbestos is generally found in pipe insulation and clad board for walls.

1. **Chrysotile** (white, cream, or light grey asbestos) – is the most commonly used type of asbestos accounting for 80% to 90% of all use in commercial operations.
2. **Amosite** (brown asbestos) – has been used in sprayed coatings in heat insulation products and in asbestos cement products where greater structural strength is required.
3. **Crocidolite** (blue or blue/grey asbestos) – is no longer used and is rarely found; its use is banned. It was once commonly used in sprayed coatings on structural steelwork for fire protection and for heat or noise insulation and was used in gasket materials and asbestos cement pipe.
4. **Tremolite** (white to light green) – is rarely encountered as insulation and has little commercial value or use.

Of all of the types of asbestos, crocidolite is considered to be the most dangerous. Chrysotile is considered to be less toxic. Amosite and tremolite are thought to be intermediate in toxicity between chrysotile and crocidolite.

1.4 Health Effects

Asbestos can affect the body if the fibres are inhaled. Once inhaled, the fibres settle in the airways and lung tissues. Long-term exposure to all forms of asbestos is associated with an increased risk of asbestosis, lung cancer, mesothelioma, and other cancers.

1. **Asbestosis** is a progressive, irreversible fibrosis of the lungs, caused by microscopic damage to the lung tissues and consequent scar tissue formation. The scar tissue, which is non-elastic (cannot stretch), restricts expansion of the lungs creating breathing problems; the disease is debilitating and can worsen even if exposure stops. In extreme cases, asbestosis may be fatal.
2. **Lung cancer** is a very serious form of cancer, usually with a fatal outcome. The risk of lung cancer is greatly increased (70 times greater) in persons who are exposed to asbestos and who also smoke. Lung cancer takes about 15-25 years to develop, depending on the amount of exposure.
3. **Mesothelioma** is a rapidly fatal cancer of the lining of the lungs. It is currently considered to be incurable. The time period between exposure and the onset of disease can range from 15-55 years.
4. **Other asbestos-related cancers** are known to have particularly long latency periods; 15 to 40 years between the initial exposure and diagnosis of the disease.

1.5 Asbestos Requirements

1.5.1 Hazard Identification and Control

All asbestos removal regardless of the quantity or location requires:

- Hazard identification
- Risk assessment
- Controls
- Safety meeting
- Safe Work Agreement (SWA)

Note: All affected workers must be included in the hazard identification and control or elimination of those identified hazards.

Asbestos materials are generally common on buildings and equipment at facilities manufactured before 1980; however, asbestos can be found in low friability products such as gaskets and cement boards manufactured into the 1990's. Identification of asbestos requires laboratory analysis of bulk samples. In general, a material is considered to contain asbestos if it contains 1% or greater asbestos content by weight.

To properly assess the risk of exposure, a variety of factors are included such as:

- Asbestos content,
- Friability (ability to break apart and become airborne),
- Condition of the material, and
- Accessibility

Wherever asbestos is suspected at a Harvest facility, an asbestos exposure risk assessment will be conducted by qualified personnel trained and experienced in asbestos. If asbestos is confirmed at a facility, an Asbestos Management Program will be developed and implemented, consisting of the following elements:

- Inventory of asbestos-containing materials (ACM).
- Asbestos processes that workers are allowed to undertake,
- Emergency procedures in case of damage or an uncontrolled release of asbestos fibres.
- Procedures to follow if changes occur to either the condition of material or risk of exposure.
- Annual inspection of ACM, following appropriate procedures.
- Training requirements for personnel who conduct inspections, or who may come into contact with ACM.
- Notification procedures for government, site workers, and contractors.
- Labeling and signage for asbestos, as per the Workplace Hazardous Materials Information System (WHMIS) requirements.
- A written exposure control plan for reference by workers.

All materials that may contain asbestos will be disturbed as little as reasonably possible to prevent asbestos release to the environment and worker exposure. As part of the exposure control plan, procedures will be developed to ensure that accidental asbestos releases and exposures are minimized using methods appropriate to site-specific situations.

The exposure control plan and disposal procedures will be specified in the site-specific Asbestos Management Program.

1.5.2 Regulatory Notification

In Alberta, written notification, using the Asbestos Notification Form and submitted to HS.OHSAsbestosNotification@gov.ab.ca, must be given to Occupational Health and Safety at least 72 hours before starting any work involving the disturbance of asbestos. This notification must include the location of the worksite, the start and completion dates, and a description of the work to be performed. For more information, contact the Occupational Health and Safety Contact Center at 1-866-415-8690.

In Saskatchewan, written notification, using the Notification of High Risk Asbestos Process Form and submitted to OHSAsbestosNotification@gov.sk.ca, of a high-risk asbestos project must be provided to Occupational Health and Safety at least 14 days prior to the start of the project. For more information, contact Occupational Health and Safety at 1-800-567-7233.

In British Columbia, written notification, using the Notice of Project Form, must be submitted online http://www.worksafebc.com/insurance/managing_your_account/notice_of_project/ at least 24 hours prior to the start of the project.

1.5.3 Occupational Exposure Limits (OELs)

Inhalation of excessive quantities of asbestos fibres can cause fibrosis in the lungs. Occupational exposure limits (OELs) for 8 hours for all types of asbestos are:

Source	8-Hour (OEL)
Harvest's OEL	0.1 fibres/cubic centimetre (f/cc)
Alberta	0.1 fibres/cubic centimetre (f/cc)
British Columbia	0.1 f/cc (time weighted average)
Saskatchewan	*
**ACGIH TLV ** **	0.1 f/cc

*Asbestos is a designated substance listed in Table 20 of the Saskatchewan Occupational Health and Safety Regulations. No exposure limit is specified. However, Section 306 requires that an employer shall: "(a) provide adequate engineering controls to prevent, to the extent that is reasonably practicable, the release of the substance into the place of employment; and (b) take other measures and provide personal protective equipment that meet the requirements of Part VII to prevent, to the extent that is practicable, any significant risk to workers from the substance."

**ACGIH TLV: recommended limit only – no regulatory significance.

1.6 Training

All employees and contractors who may be required to work in areas where ACM is present must be familiar with this COP, site-specific asbestos management procedures, and have WHMIS training.

Harvest will inform all employees and contractors of the location of all known ACM. This may be accomplished through a combination of identification/labeling of process lines/tanks/vessels and on-the-job training.

1.7 Documentation

Results of asbestos sampling and exposure measurements will be maintained for the life of the facility.

1.8 Roles and Responsibilities

Roles and responsibilities for Environment Health and Safety are described in the Harvest Operations Corp EHSMS Section 1;

- Roles and responsibilities specific to this COP are described below;

1.8.1 Worksite Supervisors

Worksite Supervisors are responsible to:

- Know the location of ACM in the workplace and ensure that they are properly marked with labels or signage.
- Immediately report the accidental release of ACM to their Supervisor (submitting an incident report), and avoiding disturbance of ACM.
- Hire approved (through ComplyWorks) contractors to sample or remove asbestos.
- Ensure all workers have been provided awareness training on this COP.

1.8.2 Workers and Contractors

All workers and contractors are responsible to:

- Read and become familiar with this COP.
- Report damaged ACM or missing asbestos warning signage to their Supervisor.
- Know how ACM is labeled.
- Report to their Supervisor the accidental release of ACM, and stop work.
- Be trained in the equipment necessary to minimize exposure.

1.9 References

1.9.1 Internal References

1. EHSMS Section 2.0, Hazard Identification, Risk Assessment & Control
2. EHSMS Section 1.0, Management Commitment & Responsibilities
3. EHSMS Section 3.0, Respiratory Protection
4. EHSMS Section 3.0, Safe Work Agreement System

1.9.2 External References

1. Alberta Occupational Health and Safety Code (2009) Part 4 and Schedule 1 Tables 1&2
2. BC Occupational Health and Safety Regulations (to 2011) Part 6
3. Saskatchewan Occupational Health and Safety Regulations (to 2009) Part 23 and Table 5
4. Work Safe Alberta, Bulletin Asbestos at the Work Site, 2009
5. Work Safe Alberta, Bulletin Asbestos Containing Materials in Buildings to be Demolished, 2011
6. Work Safe Alberta, Asbestos, http://work.alberta.ca/occupational-health-safety/12508.html
7. Work Safe BC, Safe Work Practices for Handling Asbestos (1996)

1.10 Management of Change

Proposed changes to this practice can be directed to EH&S@harvestenergy.ca

BENZENE

2.0 BENZENE

2.1 Introduction

The purpose of this Code of Practice (COP) is to ensure that all "Employees and Contractors" (Workers) engaged in any work operation where exposure to Benzene may occur, are fully knowledgeable of the health hazards involved and the correct procedures to be followed to achieve full protection.

Benzene is a known human carcinogen that may cause leukemia. Benzene may also cause anemia, which is a precursor to leukemia. People experiencing anemia due to benzene exposure generally return to normal once they are removed from the benzene exposures.

Benzene exposure may result from inhalation of the vapour or skin contact with liquids and sludge's containing benzene. Absorption of the vapour through the skin may also be possible.

Benzene entering the bloodstream through the lungs or skin will collect in the fatty areas of the body such as the brain, fat deposits, and bone marrow. Benzene will also pass through the placenta and may affect the fetus' development.

Short-term health effects may include:

a) light-headedness;
b) headaches;
c) confusion,
d) unsteady gait;
e) drowsiness; and
f) nausea

Benzene may also cause eye and skin irritation.

Long-term health effects include an increased risk of leukemia and other blood effects such as a decreased blood clotting ability.

2.2 Background

Benzene originates in some oil and gas production. In the dehydration process, Benzene is co-absorbed with water by the glycol and subsequently dispersed to atmosphere through the regenerator vent. The amount is relatively small, but may be harmful to workers if not properly managed.

Tests conducted inside dehy and treater buildings at some sites indicate that Benzene concentrations in the atmosphere were often over the permissible OEL range. Therefore workers could be subjected to high exposure levels from time to time. Task such as opening and changing filters or bleeding down sight glasses inside these building would potentially overexpose workers in the short duration.

2.2.1 Physical Properties

a) **Description:** Clear, colorless-to-light-yellow liquid.
b) **Warning properties:** Sweet solvent odour at 1.5 to 5 ppm. Adequate warning for acute exposure, inadequate for chronic exposure as olfactory fatigue can occur.
c) **Specific gravity:** 0.88 (water = 1)
d) **Water solubility:** Slightly water soluble (0.07% at 20ºC)
e) **Flammability:** Flammable at temperatures (~ -11ºC), with a range of: 1.2 to 7.8% (concentration in air).
f) **Incompatibilities:** Benzene reacts explosively with strong oxidizers, such as perchlorates and nitric acid, and many fluorides.

2.3 Awareness

The following information should be reviewed annually at all sites where Benzene has been identified:

a) the health hazards presented by Benzene;
b) necessary controls and personal protective equipment;
c) the potential for Benzene exposure above the OEL in the operating area; and,
d) the Benzene Code of Practice.

2.4 Regulations

The American Conference of Governmental Industrial Hygienist (ACGIH) has recommended the TLV (Threshold Limit Value) for Benzene and is accepted in British Columbia and Saskatchewan. For the purposes of this Code of Practice Harvest Operations Corp. will also use the ACGIH OEL (Occupational Exposure Limit) for Alberta. Therefore Benzene OEL for all operations is:

a)	8-hours	0.5 ppm
b)	12-hours	0.25 ppm
c)	15-minutes	2.5 ppm

2.5 Controls and Personal Protective Equipment

Where Benzene exposures exceed legislated limits, Supervisors must ensure that task based control measures are instituted to reduce these exposures to or as close to zero as possible.

Suitable personal protective equipment shall be worn in those cases where control measures are not possible. The minimum approved PPE materials are:

a) Half mask respirators equipped with organic vapour cartridges.
b) Gloves of Viton coated neoprene, single use neoprene surgical style gloves or DuPont Barrier or Silver Shield inside neoprene or butyl rubber gloves.
c) Coveralls of Tychem 7500 if body contact likely when conducting tasks such as tank cleaning.

Gloves and chemical protective suits must be washed with soapy water as soon as possible after contact with liquids or sludge containing Benzene. Contaminated disposable gloves must be disposed of after completion of the task.

Consideration should be given to implementing engineering controls whenever possible.

Engineering controls may include some or all of the following, depending on operating conditions:

a) installing check valves or “p” traps on drain systems,
b) direct all equipment drains / bleeds into closed systems,
c) reducing liquids in equipment prior to opening for service,
d) purging with steam, or sweet clean gas, or nitrogen,
e) venting equipment outside away from workers.
f) venting pots to a closed system or outside,
g) connecting the filter pots to a venturi system to drain and dry the filters of liquid before opening,
h) installing exhaust fans to increase fresh air flow in the building, while maintaining adequate make-up air.

When utilizing an exhaust system, it should be balanced to ensure an equal volume of makeup air matches the volume of air exhausted. Passive vents may do this, if air volume is low and heating is not a consideration or by mechanical air supply units.

Wherever airborne Benzene concentrations in buildings exceed the OEL, consideration should be given to implement engineering controls such as passive air changing units or heated supplied air although other options may be more practicable.

2.6 Task Identification

Table 1, identifies some of the tasks where Benzene overexposure may be found, recommended procedures to reduce exposures and suggests the appropriate personal protective equipment required to reduce inhalation and skin absorption. Site specific procedures and controls may also need to be developed where these recommended procedures are not specific enough to control Benzene overexposure.

You will also need to conduct a Site Specific Orientation & Hazard Assessment as part of your Pre-Job meeting before conducting any work activity where Benzene has been identified during the Health Surveys for your area.

2.7 Monitoring

a) Task based, personal exposure monitoring should be conducted to identify tasks that expose workers above the OEL. Once these tasks have been identified, site specific controls should be instituted to reduce exposures.

b) Periodic general air monitoring should be conducted in buildings that have been found or have the potential to have Benzene concentrations above 0.5 ppm.

c) Air monitoring should be conducted before and during turnarounds after equipment integrity has been broken to ensure workers are not exposed.

d) On site monitoring can be done with direct reading instruments such as RAE monitors equipped with Benzene specific tubes. Monitoring should be done by trained and qualified personnel.

2.8 Table 1: Benzene Control Options

Condition	Approximate Potential Exposures	Recommended Control Procedures	PPE Requirements
1. General Operating Practices.	**0 to 0.5 ppm**	1. Open containers of hydrocarbons are not allowed in buildings. Provide closed containers and store containers outside where possible. 2. Controller boxes to be closed at all times, and vented outside. 3. Where possible, vent equipment to the outside with collection containers to prevent soil contamination. 4. Clean spills immediately as hydrocarbons generate Benzene vapours. 5. Conduct periodic air monitoring in buildings to ensure airborne concentrations are below 0.5 ppm.	None
2. Changing glycol / amine / water filters, y strainers, and orifice plates.	**0.5 to 5 ppm**	1. Until engineering controls are instituted, worker must wear PPE.	1. Respirator with organic vapour cartridges. 2. Gloves of • Viton coated neoprene; or • Single use neoprene surgical style gloves, or • DuPont Barrier or Silver Shield inside neoprene or butyl rubber gloves.
3. Tank / Vessel Cleaning and/or Inspection.	**>5 ppm**	1. When using vacuum truck it must be vented downwind from workers or wear proper PPE. 2. During steaming, if in vessel, personnel must wear PPE. 3. After steaming, measure Benzene in air before entering. Sumps or drains may contain benzene-containing fluids. Benzene concentrations above 0.5 ppm require personnel entering tanks to use PPE. Below 0.5 ppm PPE is not required except if skin contact with fluids is possible, then use gloves and chemical suit.	1. Air supplied respirator for concentrations above 5 ppm. 2. Gloves of • Viton coated neoprene; or • Single use neoprene surgical style gloves or • DuPont Barrier or Silver Shield inside neoprene or butyl rubber gloves. 3. Tychem 7500 or 9500 coveralls or rubber suits.
4. Opening systems for maintenance or repairs. (e.g. valve replacement, pipe repair, replacing valve controllers).	**> 3 ppm and < 5 ppm**	1. Ventilate general area if possible. 2. Monitor for Benzene concentrations. 2. Prepare for immediate cleaning up of fluids (spillage) after job completed. 3. Wash equipment before transferring to maintenance shop or indoor storage.	1. Respirator with organic vapour cartridges. 2. Gloves of • Viton coated neoprene; or • Single use neoprene surgical style gloves, or • DuPont Barrier or Silver Shield inside neoprene or butyl rubber gloves. 3. Tychem 7500 coveralls if contact with liquids minor, otherwise rubber suits.
5. Opening systems for maintenance or repairs. (e.g. valve replacement, pipe repair, replacing valve controllers).	**> 5 ppm**	1. Ventilate general area if possible. 2. Prepare for immediate cleaning up of fluids (spillage) after job completed. 3. Wash equipment before transferring to maintenance shop or indoor storage.	1. Air supplied respirator 2. Gloves of • Viton coated neoprene; or • Single use neoprene surgical style gloves, or • DuPont Barrier or Silver Shield inside neoprene or butyl rubber gloves. 3. Tychem 7500 coveralls if contact with liquids minor, otherwise rubber suits.

BLOOD BORNE PATHOGENS

3.0 BLOOD BORNE PATHOGENS

3.1 Purpose

The purpose of the Blood Borne Pathogen Code of Practice (COP) is to provide the operational framework for identification, assessment, and control of blood borne hazards at Harvest Operations Corp. (Harvest) worksites.

3.2 Scope/Application

This COP applies to all Harvest worksites and encompasses contracted work activities. This will ensure consistency and compliance with company, industry, and regulatory expectations relating to hazard and risk assessment, and providing effective control of known hazards in both routine and non-routine work situations.

A variety of illnesses and diseases can be transmitted from one person to another by means of exposure to blood and other bodily fluids or items contaminated with these fluids. These illnesses and diseases include but are not limited to hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV), the virus that causes AIDS. Workers exposed to blood borne pathogens are at risk for serious or life-threatening illnesses.

3.3 Definitions

The following definitions and acronyms are specific to the Blood Borne Pathogen Practice:

- **Bio-hazardous Material -** A pathogenic organism, including a blood borne pathogen, that, because of its known or reasonably believed ability to cause disease in humans, would be classified as Risk Group 2, 3 or 4 as defined by the Public Health Agency of Canada, or any material contaminated with such an organism.
- **Blood Borne Pathogens -** Pathogenic microorganisms that are present in human blood and can cause disease in humans, including but not limited to hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV).
- **EHSMS** - Harvest Operations Corp. Environment Health & Safety Management System
- **Exposure** - The state of being exposed to contact with something
- **Infectious Material or Organism** - An infectious material or organism that has been identified in an approved manner as an infectious disease hazard that poses a significantly increased exposure risk to a worker or self-employed person.
- **Occupational Exposure** - A quantity of an agent impinging (inhalation, ingestion, skin or mucous membrane contact, or percutaneous (i.e. needle/sharp puncture)) on a person that may have resulted from the performance of a worker's job duties.

3.4 Assessment

The potential for exposure to blood borne pathogens needs to be assessed and, where contact may reasonably be expected to occur, controls need to be implemented.

Exposure to blood borne pathogens or bio-hazardous materials needs to be maintained as low as possible.

Work situations and jobs with increased risk potential include but are not limited to the following:

- Any worker or contractor required to provide first aid
- Medics, nurses and doctors
- Cleanup activities following an injury where blood or bodily fluids have been spilled
- Contact with contaminated food, drugs, or water
- Camp personnel conducting room cleaning duties

Where it is reasonable to expect that workers could be exposed to blood or other potentially infectious material as part of their normal duties, a comprehensive Exposure Control Plan must be developed and implemented to eliminate or minimize the risks and hazards.

3.4.1 Site Specific Exposure Control Plan

A Site Specific Exposure Control Plan must:

- Identify any worker(s) who may be exposed.
- Identify tasks or conditions that may put workers at risk of exposure.
- Describe the ways in which an infectious material or organism can enter a worker's body and the risks associated with that entry.
- Describe the protection required to eliminate risk of entry
- Describe the signs and symptoms of any disease that a worker may be exposed to.

Describe infection control measures to be used, such as the following:

- Ventilation
- Automated processes
- Isolation rooms
- Vaccines
- Safety-engineered devices and equipment
- Health assessments appropriate to the hazard
- Immunization programs
- Personal protective equipment
- Safe work practices and procedures;
- Standard practices that incorporate universal precautions.

- The hazard of worker exposure must be managed in accordance with the hierarchy of controls:
    - Elimination of the hazard
    - Engineering controls e.g. enclose the hazard, isolate the hazard, remove or redirect the hazard.
    - Administrative controls e.g. Develop policies and procedures
    - Personal protective equipment
    - A combination of controls may be required to protect the health and safety of the worker(s).
- Identify the limitations of the infection control measures described above.
- Set out procedures to be followed in each of the following circumstances:
    - If there has been a spill or leak of an infectious material or organism,
    - If a worker has been exposed;
    - If a worker believes that they have been exposed.
- Set out the methods of cleaning, disinfecting, or disposing of clothing, personal protective equipment, and/or other equipment contaminated with an infectious material or organism that must be followed and indicate who is responsible for carrying out those activities.
- Require the investigation of all exposure incidents
- Be reviewed at least every two years or as necessary for a specific incident or to reflect advances in infection control measures.
- Be readily available to every worker who may be exposed

3.4.2 Worker Exposure and Health Monitoring

Procedures must be implemented for the post-exposure management of workers exposed to bio-hazardous materials.

Once informed of the health hazard, workers exposed to bio-hazardous materials must be advised to seek immediate medical evaluation.

3.5 Training

All employees who are at risk from exposure to blood borne pathogens must be trained in the following:

- Harvest Operations Corp. Blood Borne Pathogen Code of Practice
- Applicable Exposure Control Plan
- Use of PPE required for the task

Additional training is required when changes, such as modifications of tasks and procedures or implementation of new tasks or procedures, affect the employee's occupational exposure.

3.6 Responsibilities

Roles and responsibilities for Environment Health and Safety are described in the Harvest Operations Corp EHSMS Section 1;

- Roles and responsibilities specific to this COP are described below;

3.6.1 Supervisors

Supervisors are responsible to:

- Identify work tasks potentially involving exposure to biological hazards.
- Ensure that the risks of exposure to biological hazards are assessed, and the appropriate controls are implemented, and where necessary, an exposure control plan is developed.
- Maintain essential supplies including mouth-to-mouth covers and nitrile gloves in first aid kits.
- Ensure all workers have been provided awareness training on this COP.

3.6.2 Workers and Contractors

Workers are responsible to:

- Read and become familiar with this COP
- Implement and maintain a current Exposure Control Plan that is kept on site, available for review by Harvest.
- Be trained in the equipment necessary to implement the Exposure Control Plan.

3.7 References

3.7.1 Internal References

1. EHSMS Section 2.0, Hazard Identification, Risk Assessment & Control
2. EHSMS Section 1.0, Management Commitment & Responsibilities

3.7.2 External References

1. Work Safe Alberta, Best Practices for the Assessment and Control of Biological Hazards (Volume 2, 2009)

3.8 Management of Change

Proposed changes to this practice can be directed to EH&S@harvestenergy.ca

Appendix A – Applicable Legislation

The Blood Borne Pathogen Practice encompasses requirements of the following legislation.

1. Alberta OHS Code (2009)

a) Part 2 – Hazard Assessment, Elimination and Control

- Section 7 – *Hazard Assessment*
- Section 8 – *Worker Participation*
- Section 9 – *Hazard Elimination and Control*
- Section 10 – *Emergency Control of Hazard*

b) Part 4 – Chemical Hazards, Biological Hazards, and Harmful Substances

- Section 16(3) – *Maintaining Exposure as Low as Reasonably Achievable*

c) Part 35 – Health Care and Industries with Biological Hazards

- Section 525.1 – Exposure Control
- Section 528 – Policies and Procedures
- Section 529 – Limited Exposure
- Section 530 – *Post-Exposure Management*

2. Saskatchewan OH&S Regulations (to 2009)

a) Part III – General Duties

- Section 12 a) *General Duties of Employers*
- Section 22 b) *OH&S Program – identification of existing and potential risks to the health and safety of workers.... and measures.....that will be taken to reduce, eliminate, or control those risks.*

b) Part VI – General Health Requirements

- Section 85 – *Exposure Control Plan*

c) Part XXI – Chemical and Biological Substances
d) Part XXXI – Additional Protection for Health Care Workers

3. Work Safe OH&S Regulations British Columbia

a) Occupational Health and Safety (OHS) Regulations

- Section 6 – Substance Specific Requirements – subsection 6.3 Biological Agents

Appendix B – Site Specific Exposure Control Plan Template

1. **Date:**

2. **Worker(s) who may be exposed:**

3. **Tasks and conditions:**

4. **Ways infectious material can enter body:**

5. **Risks associated with entry:**

6. **Signs and symptoms of disease(s) worker(s) may be exposed to:**

7. **Control measures:**

- **Hand washing**
  Readily accessible hand washing facilities shall be provided, or, if this is not feasible, an appropriate antiseptic hand cleanser and clean cloth or paper towels. In any case, employees shall wash hands with soap and running water as soon as feasible after removal of gloves or other personal protective equipment.

- **Eating, Drinking, etc.**
  Eating, drinking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure. Food and drink shall not be kept where blood or other potentially infectious materials are present.

- **Splashing, Spraying, Spattering**
  All tasks involving blood or other potentially infectious materials shall be performed so as to minimize splashing, spraying, spattering, and generation of droplets.

- **Potentially Contaminated Equipment**
  Any equipment that may be contaminated shall be decontaminated prior to use.

- **Personal Protective Equipment**
  Personal protective equipment shall be repaired or replaced as needed to maintain its effectiveness. All personal protective equipment shall be removed prior to leaving the work area.

- **Gloves**
  Gloves shall be worn when it is reasonably anticipated that employees may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin. Gloves shall also be worn when handling or touching contaminated items or surfaces. Disposable gloves shall be replaced as soon as practical when contaminated, torn, punctured, or otherwise compromised in their ability to function as a barrier.

- **Gowns, Aprons, and Other Protective Body Clothing**
  Appropriate protective body clothing shall be worn in occupational exposure situations.

8. Labels

Warning labels are required on containers of bio-hazardous waste (unless the waste is placed into red/orange bags), other containers used to store, transport, or ship blood or other potentially infectious materials. The labels shall include the biohazard symbol and the word "biohazard."

9. Housekeeping

All equipment, environmental and working surfaces shall be cleaned and decontaminated with an appropriate disinfectant after contact with blood or other potentially infectious material. Decontamination shall occur immediately or as soon as feasible after any contamination of surfaces or after any spill of blood or other potentially infectious materials.

10. Waste Disposal

- **Needles and sharps**
  Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except as noted below. Shearing or breaking of contaminated needles is prohibited. Contaminated needles and sharps shall be recapped or removed only when no alternative is available or when it is required by a specific medical procedure. Any recapping or removal must be accomplished through the use of a mechanical device or a one-handed technique. The recapping or removal of contaminated sharps is actively discouraged under any circumstances because of the high potential risk of injection.
  Immediately after use, contaminated sharps shall be placed in a sharps container that is puncture-resistant, labeled or color-coded, and leak proof.

- **Bio-hazardous Wastes**
  Other waste containers that contain blood or other potentially infectious material shall be closable, able to contain all contents, leak proof, labeled and/or color-coded, and closed securely prior to removal. If the primary waste container is contaminated on the outside, a closable, sturdy, leak proof, and labeled or color-coded secondary container shall be used, and it shall also be closed prior to removal.

11. Laundry

Contaminated laundry shall be handled as little as possible with a minimum of agitation. It shall be placed into bags or containers at the point of use. It shall not be sorted or rinsed in the location of use. The bags or containers shall be labeled with the biohazard symbol or color-coded (red/orange). The bag or container shall be constructed to prevent soak-through or leakage.

12. Post exposure Evaluation and Follow-up

Following a report of an exposure incident, the supervisor shall ensure that a confidential medical evaluation and follow-up are made available to the exposed employee. All exposure incidents must be investigated.

CONFINED SPACE ENTRY

4.0 CONFINED SPACE ENTRY

4.1 Policy

This Confined Space Code of Practice (COP) applies to all workers working at Harvest facilities or at locations where Harvest is the prime contractor. The practice describes the safe work procedures and regulatory requirements when workers are or may be required to work in confined or restricted spaces.

4.2 Purpose

The purpose of this COP is to ensure all reasonable precautions have taken place to protect the safety of workers who are or may be required to work in a confined or restricted space.

4.3 Regulatory Requirements

In Alberta, Part 5 of the Occupational Health and Safety (OHS) Code requires an employer to have a written COP for the procedures to be followed when a worker enters a confined space.

In BC, Part 9 of the Occupational Health and Safety Regulations requires an employer to implement a written confined space entry program.

In Saskatchewan, Part XVIII of the Occupational Health and Safety Regulation requires an employer to fulfil the confined space requirements as stated in the Regulation.

The following Code of Practice will adhere to the intent of all 3 provincial regulations using Alberta's COP process as a guideline. Any difference in interprovincial regulatory requirements will be highlighted.

4.4 What is a Confined / Restricted Space

A **confined space** means a restricted space which may become hazardous to a worker entering it because of:

a) an atmosphere that is or may be injurious by reason of oxygen deficiency or enrichment, flammability, explosivity or toxicity,
b) a condition or changing set of circumstances within the space that presents a potential for injury or illness, or
c) the potential or inherent characteristics of an activity which can produce adverse or harmful consequences within the space.

Confined spaces usually have poor natural ventilation and contain, or may contain, a dangerous atmosphere.

Examples of confined spaces include: tanks, vessels, towers, heaters, coolers, sumps, mud pits, pipe racks, utility corridors, caissons, excavations and diked areas when limited access/egress and the atmosphere cannot be guaranteed.

A **restricted space** is defined as an enclosed or partially enclosed space, not designed or intended for continuous human occupancy; that has a restricted, limited or impeded means of entry or exit because of its construction.

A restricted space can be thought of as a work area in which the only hazard is the difficulty in getting into and out of the space — all other hazards have been eliminated or controlled.

Restricted spaces are therefore not subject to the specific confined space entry permitting, atmospheric testing and tending worker (safety watch) requirements of a confined space.

Note: A restricted space can become a confined space if conditions or work practices change.

See Appendix A for a flowchart to determine if an area or work space is a confined or restricted space or neither.

Important – All confined or restricted spaces must be identified at a worksite.

4.5 Hazards of Confined / Restricted Spaces

All hazards associated with a confined or restricted space must be assessed and controlled as pre the Hazard Identification, Risk Assessment & Control in the Harvest Environment, Health & Safety Management System (EHSMS).

Hazards in confined spaces usually fall within four categories: Atmospheric, Safety, Work-related or Human Factors.

Atmospheric hazards: include explosive gases or vapours, toxic gases or vapours, oxygen level content, fumes, dust, smoke or biological contaminants. Usually only associated with confined spaces.

Safety hazards: include poor entry/exit points, being trapped or crushed by machinery, residual chemicals stuck to surfaces, uncontrolled introduction of steam, water, or other gas or liquid, unguarded energized electrical equipment, low visibility, physical obstacles, hot or slippery surfaces, traffic around the confined space, temperature extremes, humidity, vibration or radiation.

Work-related hazards: include hot work, pressurized equipment/piping, use of chemicals, sandblasting, grinding, noise and cutting.

Human factor hazards: such as phobias (fear of heights or enclosed spaces), human error and physical condition of the worker that could interfere with the workers ability to work in a confined space.

4.6 Training Requirements

A supervisor or worker involved in any aspect of a confined or restricted space entry must have the following minimum training requirements:

- Enform - Electronic General Safety Orientation (eGSO)
- Harvest's Level 4: Corporate EHSMS
- All personnel involved in the confined space entry and or rescue must receive Harvest supplement training on this confined space COP.
- Hold a valid industry approved certification in Confined Space Entry and or Rescue.
- Standard First Aid/CPR.
- H2S Alive
- Harvest Emergency Response Training.

As a minimum, the industry approved training must include:

- Safe work procedures for entry into a confined / restricted space.
- Safe work procedures for working inside a confined / restricted space.
- Hazard recognition.
- Content of an entry permit.
- How to properly use the control measure in place to protect workers, and
- What to do for first aid and in an emergency.
- How to develop an emergency rescue plan.

Additional worker training may be required. See the Harvest EHSMS – Orientation and Training for a complete list of training requirements.

Training records must be retained and available for review if required.

4.7 Confined Space Entry Permit System

The Confined Space Entry permit must be completed and signed by all workers and the worksite supervisor before a worker enters a confined space.

See the forms section in the EHSMS for a copy of the Confined Space Entry Permit.

The permit must be posted at a minimum of one designated point of entry.

Once issued, the information on an entry permit may only be altered by the worksite supervisor, the safety watch to update the list of workers inside the confined space and record test results.

The permit must be re-issued and signed by the worksite supervisor when there is a change in work crew, after each shift change or a change in the worksite supervisor.

A signed copy of the Confined Space Entry Permit must be kept on record for a minimum of one year.

4.8 Pre-Entry Procedures and Requirements

4.8.1 Site Specific Orientation & Hazard Assessment

A site specific orientation & hazard assessment must be conducted by a competent person for each confined or restricted space and work activity to be performed in the space. The site specific orientation & hazard assessment must include consideration to all the hazards identified in this COP.

BC Note: In BC, qualified personnel required to perform the hazard assessment and written confined space entry procedure must be either a certified industrial hygienist (CIH), registered occupational hygienist (ROH), certified safety professional (CSP), Canadian registered safety professional (CRSP) or professional engineer (P.Eng.); provided that the holders of these qualifications have experience in confined space hazard assessment and control OR other combination of education, training and experience acceptable to the Board.

SASK Note: In Saskatchewan, where a worker may be required to enter a confined space, in consultation with the Harvest EH&S Sask Committee, determine if alternative means to perform the work is possible without having the worker to enter a confined space.

4.8.2 Testing the Atmosphere

If the site specific orientation & hazard assessment identifies a potential atmospheric hazard and the worker is required to enter the confined space then a pre-entry atmospheric test must be performed to:

a) Verify that the oxygen content is between 19.5 percent and 23 precent by volume, and
b) Identify the amount of toxic, flammable or explosive substance that may be present

Consideration must be given to atmospheric testing methods that do not require personnel to enter the confined space to complete the atmospheric test (e.g., aspirator, vacuum pump).

Where practicable, continuous monitoring of the atmosphere must be done.

NOTE: In BC, the pre-entry testing must be completed not more than 20 minutes before a worker enters a confined space.

A competent person must be used to test the atmosphere and to implement controls to ensure the safety of the worker.

Unknown atmospheres must be tested wearing self contained or supplied air respirators.

If the atmosphere is below 19.5% then supplied air respiratory equipment is required. No entry is permitted if the oxygen content exceeds 23%.

If toxic gases are present above occupational exposure limits (OEL), appropriate respiratory equipment is required.

No worker shall enter a confined space if the atmosphere is within an explosive range. Any concentration above the lower explosive limit (LEL) or below the upper explosive limit (UEL) is explosive.

Testing is to be done using a calibrated test instrument appropriate for the atmosphere being tested and used in accordance with manufacturer's specifications.

Note: Personal gas monitors (detectors) are NOT to be used for atmospheric testing.

Testing results must be recorded on the Confined Space Entry Permit. Maintenance and calibration records must be maintained at the site.

4.8.3 Ventilating, Purging and Inverting

If atmospheric testing identifies that a hazardous atmosphere exists or is likely to exist in a confined space due to changing conditions, then the confined space must be properly ventilated, purged, or inerted before a worker enters the confined space.

If venting or purging is impractical then appropriate PPE including respirators or breathing apparatus must be worn. If mechanical ventilation is needed then the ventilation system must use an alarm to alert workers to a failure of the system so that workers have sufficient time to leave the confined space. All workers must receive training in evacuation procedures if there is the potential for the ventilation systems to fail.

If a confined space is inerted, then every worker entering the confined space must have supplied air respiratory protection, all ignition sources are controlled, and the atmosphere stays inerted.

> **Note:** In BC, Harvest must notify the Board in writing, and submit a copy of the proposed procedures, at least 7 days before a worker enters a confined space which will be inerted.

4.8.4 Isolation of Hazardous Substances & Energy

When preparing a confined space for entry, all pipes and lines that may be a potential source of hazardous material must be disconnected, capped, or blinded as per Harvest's Lockout – Tagout (Zero Energy) Safe Operating Procedure.

Except when used in an acceptable double block and bleed system, the closing of one or more valves in line is not an acceptable means of isolation.

> **Note:** In BC, for double block and bleeds, the bleed must be checked to ensure that it remains clear of obstructions while the confined space is occupied, either by continuous automatic monitoring or by manually checking within 20 minutes before worker entry.

All rotating equipment must be immobilized and secured as per Harvest's Lockout – Tagout (Zero Energy) Safe Operating Procedure.

Where it is impractical to isolate in accordance with the above requirements, a written detailed procedure, that provides equal or greater protection, must be developed and approved via the Harvest Management of Change process and procedures.

For additional information regarding Respiratory Protection see Respiratory Protection Code of Practice.

4.8.5 Communication Plan

A communication system must be established and maintained between the safety watch and the workers in the confined space. The method of communication may include simple voice, visual contact, intrinsically safe communication devices, alarms or ropes/lifelines.

In addition, a means of communication must be maintained between the safety watch and the rescue workers.

> **Note:** In BC, the safety watch must check on the worker inside the confined space at least every 20 minutes.

4.8.6 Summary Pre-Entry Requirements for a Confined and Restricted Space

Confined Space	Restricted Space
Completed Safe Work Agreement	Completed Safe Work Agreement
Completed Confined Space Permit	Site Specific Orientation & Hazard Assessment and Controls
Site Specific Orientation & Hazard Assessment and Controls	Communication Plan
Task specific JSA's	Task specific JSA's
Continuous Atmospheric Testing	All PPE identified and worn
Confined space purged and ventilated	Rescue plan in place
Energy Isolation	
Communication Plan	
All PPE identified and worn	
Safety Watch(s) in place	
Rescue personnel and plan in place – rescue equipment setup and ready for use.	

4.9 Emergency Response

A **written rescue plan** must be developed and reviewed at the work site prior to a worker entering a confined space. The following items must be addressed in the rescue plan:

- A description of the equipment configuration in the confined space.
- Potential hazards
- A list of the rescue equipment (including PPE) for first aiders and rescue workers must be detailed e.g. body harness, lifelines, stretchers etc.
- A description of the rescue procedure (who, what and how?)
- Monitoring of entrances and exists
- A description of the communication plan.

Rescue plans must be kept on the site at or near the confined space(s) during the confined space entry.

A competent safety watch(s) must be in attendance at the entry point(s) of the confined space at all times. For specific responsibilities of the safety watch see Section 10 of this document.

Harvest has the following general 7 steps to take during an emergency situation:

1. Evacuate

- Get away from the hazard – direct others to safe area.

2. Alarm

- Alert others to the danger and situation

3. Call for Help

- Notify your supervisor
- If your supervisor cannot be contacted, call 1-800-760-2826

4. Assess

- Assess hazards - don't just rush in and endanger yourself.
- Account for all personnel.

5. Rescue victims

- Protect yourself and others - use appropriate procedures and protective equipment.
- Remove victims to a safe location.
- Revive victims.
- Administer first aid.
- Ensure medical aid or transport has been dispatched.

6. Secure the area

- Prevent unauthorized access.
- Take steps to protect the environment, property and equipment.

7. Act as the On-site Supervisor until relieved by appropriate Harvest Supervisor.

- In addition, refer to Harvest's Corporate ERP or Site-specific ERPs for more information on Harvest's ERP policies and procedures.

4.10 Confined Space Entry Responsibilities

In addition to the EH&S responsibilities outlined in the EHSMS; the following responsibilities are specific to working in a confined or restricted space:

4.10.1 Harvest Superintendent and Managers

- Check that all employers on the worksite have an effective safety program in accordance with the Harvest's Contractor Engagement system.
- Regularly review performance of the Confined Space Entry COP.
- Ensure that Confined Space Entry and Rescue training needs are identified and workers are competent to perform their tasks.

- Ensure that emergency response plans are updated regularly and that Confined Space rescue exercises are conducted on a regular schedule.
- Ensure that Worksite Supervisors receive the orientation to the Confined Space COP.

4.10.2 Harvest Foremen and Supervisors

- Ensure that appropriate Confined Space COP orientations are conducted and recorded for all new or transferred workers.
- Ensure appropriate safety equipment specific to Confined Space Entry and Rescue including PPE is readily available, used and well maintained.
- Review the Confined Space Entry COP with all workers and enforce compliance.
- Inform workers of their responsibility to identify unsafe Confined Space conditions or activities and their right to refuse unsafe work.
- Ensure identified Confined Space Entry and Rescue training requirements are met for all workers.
- Ensure that Confined Space hazards are identified and controlled before work proceeds.
- Ensure workers are informed of the worksite hazards and participate in hazard assessment and control identification and implementation.
- Ensure that SDS's are available for all products that are brought or produced on-site and that workers are aware of them.
- Ensure workplace labels are attached to all hazardous material containers as per WHMIS regulations.
- Ensure that effective emergency response exercises related to Confined Space Entry and Rescue are conducted prior or during the confined space entry.

4.10.3 Worksite Supervisor

- Check that all employers on the worksite have effective safe work procedures for Confined Space Entry and Rescue.
- Ensure that the contractors and subcontractors understand and agrees to follow all the requirements of Harvest's Confined Space COP that are not already met by their own safety program.
- Ensure all workers have completed the Enform – Electronic General Safety Orientation (eGSO).
- Ensure the Confined Space COP is reviewed and understood.
- Verify that all workers involved in the confined space entry and rescue have received the appropriate Confined Space training and are under qualified supervision.
- Identify Confined Space hazards related to the specific work site, the planned program or the materials provided by Harvest. Inform all employers' supervisors of these hazards and ensure proper controls are in place before the work begins.

- Establish and co-ordinate site-specific emergency response procedures. Post this information, review procedures and conduct practice drills with all personnel on site.
- Monitor the work performed by all workers to verify compliance with the Confined Space COP.
- Direct work to be stopped when an unsafe act or condition is identified. Resume work only after the Confined Space hazard is removed or safe procedures have been established.

4.10.4 Contractors and Subcontractors

- Ensure that their employees have received the Harvest's Confined Space COP orientation before working for Harvest.
- Inform their employees of the responsibility to identify and to refuse unsafe work and ensure work is safe to perform before activity is resumed.
- Ensure employees are competent and fit to perform their job safely and efficiently in a Confined Space environment.
- Ensure only properly trained employees operate equipment or machinery.
- Ensure proper PPE is available, utilized by all personnel and properly maintained.
- Conduct frequent inspections of the work site to ensure employees are following the Confined Space COP.
- Ensure employees identify Confined Space hazards and inform supervisor of the hazards and help with developing controls to eliminate or reduce the risk.
- Ensure all hazardous materials brought on site are identified; applicable SDS's are available and reviewed with employees.
- Ensure that site specific emergency response plans and rescue plans are in place, that employees are familiar with them and will follow the plan in an emergency.

4.10.5 Workers

- Attend and actively participate in all pre-job, tailgate and general safety meetings.
- Ensure that they have received the Harvest's Confined Space COP orientation before working for Harvest.
- Follow environment, health and safety standards and safe work procedures set out by the employer for working in Confined Spaces.
- Refuse to perform work when unsafe conditions exist (as defined in Provincial Occupational Health and Safety legislation).
- Refuse to perform work when they are not competent to perform the task.
- Immediately report potential Confined Space hazards to supervisors.
- Use required personal protective and safety equipment as per the Site Specific Orientation & Hazard Assessment process.
- Check tools and equipment, including personal protective and safety

equipment for hazards before using them.
- Know the location, type and operation of emergency equipment.
- Fully understand the emergency rescue plan.

4.10.6 Safety Watch

- Ensure that they have received the Harvest's Confined Space COP orientation before working for Harvest.
- The Safety Watch is to monitor the safety of the person(s) working inside the confined / restricted space and to take necessary action if an emergency arises.
- Observes work tasks being performed.
- Ensures ongoing communication with those in the confined / restricted space.
- Initiates the emergency rescue plan and activation of the rescue team.
- Maintains entry log and tool log to ensure all personnel and tools are accounted for.
- Ensures unsupervised entry points are properly signed with "Do Not Enter" or made inaccessible by other means.
- Verify all workers involved have proper training.
- Other duties as described in the pre-job safety meeting.
- Must never leave their assigned post unless relieved by a competent person.
- Must never enter the confined space.

4.11 Record Keeping Requirements

All records associated with a confined space entry (e.g. permits, calibration records, training) must be kept at the nearest field office for a minimum of 2 years.

4.12 Definitions

Competent worker – adequately qualified, suitably trained, and with sufficient experience, to safely perform work that is the subject-matter of the relevant provision of this COP without or with only a minimal degree of supervision.

Confined Space - A confined space means a restricted space which may become hazardous to a worker entering it because of:

a) an atmosphere that is or may be injurious by reason of oxygen deficiency or enrichment, flammability, explosivity or toxicity,
b) a condition or changing set of circumstances within the space that presents a potential for injury or illness, or
c) the potential or inherent characteristics of an activity which can produce adverse or harmful consequences within the space.

Confined Space Entry Permit – outlines the work to be done and the precautions to be taken. It functions as a checklist to ensure that the requirements of Harvest's COP have been addressed

Flammable Atmosphere – Any atmosphere that contains more than 10% of the Lower Explosive Limit (LEL) of a flammable gas or vapor

LEL (Lower Explosive Limit) – The lowest concentration of a combustible gas in air, which will result in an explosion if ignited

Rescue plan – a rescue plan outlines all the procedures that will take place to successfully rescue an injured or entrapped person from a confined or restricted space

Safety Watch – A worker whose role is strictly that of monitoring the work inside the confined space and to take action if an emergency arises

Toxic Atmosphere – An atmosphere that contains greater than the Occupational Exposure Limit (OEL) of a gas, vapor, or particulate according to values established by provincial regulations

UEL (Upper Explosive Limit) – The highest concentration of a combustible gas in air, which will result in an explosion if ignited

4.13 Reference

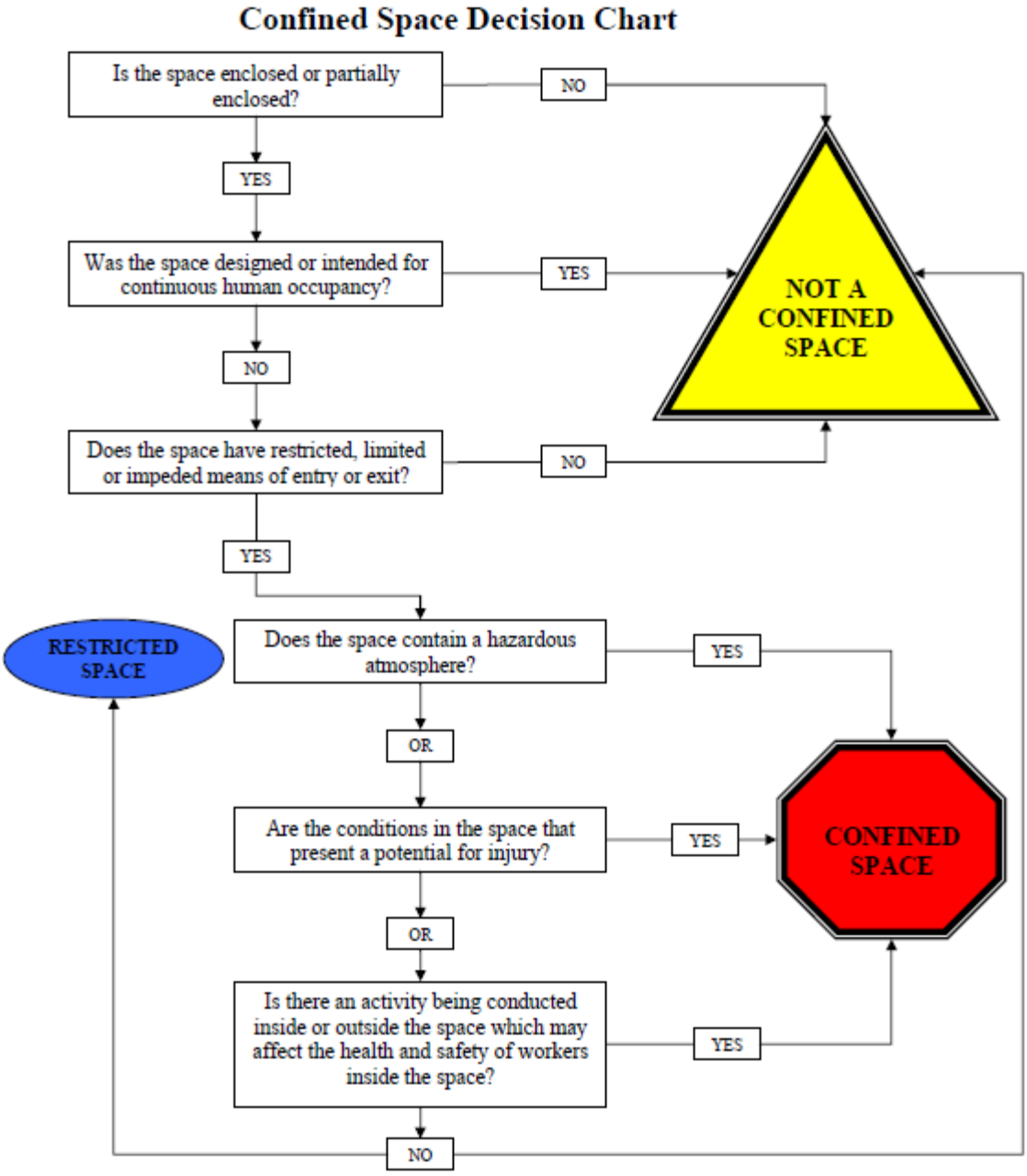
Alberta Occupational Health and Safety Code, 2009 – Part 5

Alberta Workplace Health and Safety. Guideline for Developing a Code of Practice for Confined Space Entry, June 2009

British Columbia Occupational Health and Safety Regulation, 2009 – Part 9

Saskatchewan Occupational Health and Safety Regulations, 1996 – Part XVIII

Appendix A Confined Space Flowchart



CRYSTALLINE SILICA

5.0 CRYSTALLINE SILICA

5.1 Introduction

The Crystalline Silica Code of Practice (COP) is to fulfill regulatory requirements to provide the operational framework for the identification, assessment, and control of silica exposure on Harvest worksites.

The Crystalline Silica COP provides guidance to all Harvest workers and contractors and encompasses all Harvest activities. The COP sets the minimum standards and expectations regarding protecting worker's health and safety from silica hazards.

5.2 Definitions

CL - Contamination Limit

Crystalline Silica - an abundant mineral found naturally in rock and soil as well as many products.

Quartz - one of the most abundant forms of crystalline silica.

Respirable – capable of being taken in by breathing

Silicosis - the development of scar tissue in the lungs from chronic exposure to crystalline silica.

TLV - Threshold Limit Value

5.3 What is Crystalline Silica

Silica is a naturally occurring mineral that may be either crystalline (structured) or amorphous (not structured). Crystalline silica is a basic component of soil, sand, granite, and many other minerals. Quartz is the most common form of crystalline silica; however, other forms exist as well. Crystalline silica is used extensively in many industrial applications because of its unique physical and chemical properties. Health concerns arise when silica containing products are disturbed by grinding, cutting, drilling, or chipping creating respirable particulates.

5.4 Exposure

Silica exposure can occur in a variety of areas depending on what products are being used that contain 0.1% crystalline silica by weight or more or by what activities are being conducted in the presence of naturally containing silica products such as road gravel.

Silica exposure may be a concern in the following areas:

- Fracing operations
- Bulk plant operations
- Drilling operations during handling of mud additives
- Drilling operations during cementing operations
- A variety of construction activities such as concrete cutting and jack hammering
- Road construction activities
- Handling solid desiccants
- Abrasive blasting using sand

Crystalline silica is in general highly regulated across Canada because of the severity of potential health effects and the abundance of crystalline silica that exists in many products or work environments. This legislation consists of occupational exposure levels (OELs), minimizing the release of silica dust, designating restricted areas, signage, worker decontamination, and health monitoring. For specific legislation in your work area, please refer to the references section of this COP.

	Crystalline Silica Respirable Fraction (mg/m^3)					
	Cristobalite		**Quartz**		**Tridymite**	
	8-Hour	15-minute	8-Hour	15-Minute	8-Hour	15-Minute
Alberta OEL	0.025	-	0.025	-	0.025	-
Saskatchewan CL	0.05	-	0.05	-	-	-
British Columbia CL	0.025	-	0.025	-	-	-
ACGIH TLV	0.025	-	0.025	-	0.025	-
	mg/m^3 – milligrams of substance per cubic metre of air					

Note: Quartz, cristobalite, and tridymite are the three most common crystalline forms of free silica and are classified as “Group 1, carcinogenic to humans”.

In Alberta, worker exposure to any substance listed in the OHS Code (Schedule 1, Table 2) must be kept as low as reasonably achievable and must not exceed its occupational exposure limit or ceiling limit listed in Table 2 at any time.

In Saskatchewan, worker exposure to any substance listed in the OHS Regulations (Table 21) must be kept as low as reasonably achievable and must not exceed the contamination limit listed in Table 21.

5.5 Health Effects

Crystalline silica dust particles that are small enough to be inhaled into the lungs can cause a number of health problems, including silicosis, lung cancer, chronic obstructive pulmonary disease and emphysema, as well as pulmonary tuberculosis.

A. **Silicosis -** is caused when crystalline silica particles less than 10 microns in diameter are inhaled and deposited in the lungs. This is known as “respirable” silica. Lung tissue reacts by developing lumps and scarring around the trapped silica particles. If the lumps and scar tissue grow too large, breathing becomes difficult and death may result.

Factors that influence the development of silicosis include:

- particle type e.g. quartz
- particle size — particles larger than 10 microns in diameter tend to be deposited in the nose or throat rather than the lungs
- how long a person is exposed to silica dust
- the concentration of silica dust in the air
- individual susceptibility

Silicosis can develop or progress even though exposure to crystalline silica has stopped. Three types of silicosis can develop:

1. *Chronic silicosis* — may develop due to ongoing (chronic) exposure to relatively low concentrations over a long period of time i.e. ten or more years.
2. *Accelerated silicosis* — may develop five to ten years after the first exposure to high concentrations.
3. *Acute silicosis* — may develop after exposure to very high concentrations of respirable silica. Symptoms appear within a few weeks to five years of the initial exposure. This disease is usually associated with a history of repeated exposures to tasks that produce small particles of airborne dust with a high silica content e.g. sandblasting, rock drilling or quartz milling.

Workers with silicosis may at first have no symptoms. As the disease progresses, coughing develops and breathing becomes difficult. Persons with silicosis have an increased risk of contracting respiratory infections such as pneumonia and tuberculosis. This happens when lung cells that normally kill infectious organisms are overwhelmed by silica dust and are unable to do their job.

B. **Lung Cancer** - In 1996, the International Agency for Research on Cancer (IARC) concluded that there was enough scientific evidence to suggest that occupational exposure to respirable quartz and cristobalite can cause cancer. Quartz and cristobalite are classified as “Group 1, carcinogenic to humans”. Workers exposed to high concentrations of respirable dust who have developed silicosis have an increased risk of developing lung cancer.

5.6 Hazard Identification

All tasks requiring the use of or exposure to crystalline silica requires:

- Hazard identification
- Risk assessment
- Controls
- Safety meeting
- Safe Work Agreement (SWA)

If you are working with products that contain crystalline silica and if airborne dust may be generated, hazard identification is required. Exposure to carcinogens should be maintained as low as reasonably possible. All affected workers (i.e., the work crew and other workers in the area that might be affected by dust) must be included in the hazard identification and in the control or elimination of those identified hazards. Please reference section 2 of the EHSMS - Hazard Identification, Risk Assessment and Control for more guidance.

5.7 Hazard Controls

All reasonable efforts must be made to eliminate the silica hazard where possible or control it by means of the control methods listed below.

5.7.1 Substitution

For many products that use silica as an ingredient, there are no substitute materials. However, where possible, consider using substitutes to silica-containing materials.

5.7.2 Engineering

Engineering controls are mechanical processes used to eliminate exposure to a dust by removing the dust from the air or providing a barrier between the worker and the dust. Examples of engineering controls used to prevent exposure to crystalline silica include:

- Wet processes such as wet abrasive blasting or wet cutting
- Installing local ventilation hoods
- Installing dust collection systems onto machines or equipment
- Dust control additives
- Enclosures around the work process
- Automated processes e.g. robotics
- Use of alternative equipment e.g. use of vacuums instead of compressed air lances or dry sweeping to remove debris from cracks in road repair.

5.7.3 Administrative

Work practices can be implemented at the workplace to reduce potential exposure to silica dust. Examples include:

- Educating workers to understand the hazards associated with crystalline silica. Workers must participate in training and monitoring programs.
- Using good hygiene practices — workers must not eat, drink or use tobacco products in areas contaminated by crystalline silica. The hands and face should be washed before eating, drinking or smoking.
- Ensuring that engineering controls and other equipment used to reduce exposure are used and maintained properly.
- Posting warning signs of the hazards and informing workers about the required PPE needed in areas where they may be exposed to crystalline silica or the product is used.

5.7.4 Personal Protective Equipment

Where these controls cannot be used or are not effective, respiratory protection shall be used. Respiratory protection shall consist of at a minimum a half-mask respirator (NIOSH-approved) equipped with P100 filters. For additional information, please reference the Respiratory Protection Code of Practice located in the EHSMS.

Note: If the hazard cannot be eliminated or adequately controlled using any single method noted above, then a combination of engineering controls, administrative controls and PPE may be used to achieve an acceptable level of safety.

5.8 Training

All employees who may be required to work in areas where airborne crystalline silica is present must be trained in crystalline silica awareness. This training will at a minimum include:

- Regulatory requirements relevant to the jurisdiction where the work is being conducted.
- Harvest Operations Corp. Crystalline Silica Code of Practice.
- Communication and monitoring for the control of crystalline silica hazards.
- Application of hazard identification and control tools including applicable permits, checklists, worksheets etc.

5.9 Roles and Responsibilities

Roles and responsibilities for Environment Health and Safety are described in the Harvest Operations Corp EHSMS Section 1;

- Roles and responsibilities specific to this COP are described below;

5.9.1 Worksite Supervisors

Worksite Supervisors are responsible to:

- Ensure all workers have been provided awareness training on this COP.

5.9.2 Workers, Contractors & Subcontractors

All workers are responsible to:

- Read and become familiar with this COP.
- Be trained in the equipment necessary to minimize exposure.

5.10 References

5.10.1 Internal References

1. EHSMS Section 2.0, Hazard Identification, Risk Assessment & Control
2. EHSMS Section 1.0, Management Commitment & Responsibilities
3. EHSMS Section 3.0, Respiratory Protection
4. EHSMS Section 3.0, Safe Work Agreement System

5.10.2 External References

1. Alberta Occupational Health and Safety Code (2009) Part 2, Part 4 and Schedule 1 Table 2
2. BC Occupational Health and Safety Regulations (to 2011) Part 5
3. Saskatchewan Occupational Health and Safety Regulations (to 2009) Part 3, 7, 21, 24 and Table 21
4. Work Safe Alberta, Bulletin Crystalline Silica at the Work Site, 2009

5.11 Management of Change

Proposed changes to this practice can be directed to EH&S@harvestenergy.ca

FIRE & EXPLOSION HAZARD MANAGEMENT

6.0 FIRE & EXPLOSION HAZARD MANAGEMENT

6.1 Purpose

The purpose of the Fire and Explosion Hazard Management Code of Practice (COP) is to provide Harvest's field personnel and its contractors with:

- An understanding of the potential risks associated with fire and explosion hazards,
- A review of their responsibilities and duties,
- A process for identifying existing and potential fire and explosion hazards, and
- A process for identifying and selecting the control measures necessary to eliminate or manage fire and explosion hazards.

6.2 Policy

The Fire and Explosion Hazard Management COP applies to all Harvest employees, contractors, and subcontractors involved in planning, designing, or completing facility/well site operations (i.e., drilling, completions, work overs, construction, and maintenance) at Harvest facilities, work sites, or at locations where Harvest is the prime contract operator.

Where a Job Safety Analysis (JSA) has been written that follows the minimum components of, and meets the intent of the criteria in this code of practice, it shall take precedence over specific requirements herein.

6.3 Regulatory References and Sources

This code of practice is based primarily on Alberta's AER Directive 033, "Well Servicing and Completions Operations – Interim Requirement Regarding the Potential for Explosive Mixtures and Ignition in Wells" and IRP 18 "Fire and Explosion Hazard Management". Harvest facilities in Saskatchewan (SK) and British Columbia (BC) are expected to follow this practice, other relevant AER Directives, and the Alberta regulations as a minimum. However, specific SK or BC regulatory requirements which are more stringent than those in Alberta must be followed.

ERCB Directive 033: Well Servicing and Completions Operations - Interim Requirement Regarding the Potential for Explosive Mixtures and Ignition in Wells.

The following interim requirement is effective immediately and, therefore, licensees must:

a) Have documented practices available at the well site for the safe management of the potential for explosive mixtures and ignition in wells and associated surface equipment, and
b) Ensure that all well site staff responsible for well control and blowout prevention understand these practices and know how to apply them.

This interim requirement expands upon existing ERCB requirements for well control, blowout prevention, and crew training procedures to include an additional new requirement for addressing the potential for explosive mixtures and ignition in wells.

IRP Volume #18: Fire and Explosion Hazard Management.

The purpose of IRP #18 is to improve worker safety by providing industry with:

A more thorough understanding of fire and explosion hazards,

a) A process for identifying such hazards, and
b) Effective methods for managing these hazards.

Note: In some cases, the diagrams, reports and information in IRP 18 have been modified to match Harvest's procedures and requirements. Copyright ownership of IRP 18 is held by Enform.

6.4 Responsibilities and Duties

6.1.1 Superintendents, Field Foremen, Worksite Supervisors and/or Designated Alternates

a) Ensure the Fire and Explosion Hazard Management COP is implemented and followed at all facilities and worksite locations in their area of responsibility.

Note: This includes implementing other fire-related safe work practices and JSAs.

b) Ensure the Safe Work Agreement Issuers is competent in Fire and Explosion Hazard Management and has the necessary fire and explosion prevention training.
c) Have a system in place to distribute new regulatory requirements.
d) Identify those planned operations that will require a written Fire and Explosion Prevention Plan.
e) Complete routine safety checks, inspections, and audits to ensure the Fire and Explosion Hazard Management COP is being followed and the Fire and Explosion Prevention Plan, if required, is attached to the Safe Work Agreement.

6.1.2 Safe Work Agreement Issuer

a) Decide if a written Fire & Explosion Prevention Plan is necessary based on the:

- Safe Work Agreement System, or
- Hazardous locations as per the "Code for Electrical Installations at Oil and Gas Facilities" that are less than 25 metres from the work area, or
- Risk Assessment or Management of Change (MOC) process, or
- Type of planned task, operation, or process. See work requiring a written plan.

Note: For most work, the pre-job safety meeting and the Safe Work Agreement process for the primary task by itself will be sufficient, but the Safe Work Agreement Issuer is responsible for deciding if the level of risk associated with the fire and explosion hazards requires a written Fire & Explosion Prevention Plan which must be attached to the Safe Work Agreement.

b) Ensure all fuel, oxygen, and ignition sources are identified at or adjacent to the proposed work.

c) Ensure all fire and explosion hazard controls are:

- Compatible with the practices or procedures being used to complete the primary task.
- In compliance with government regulations and the equipment manufacturer's instructions/specifications.

d) Ensure the Safe Work Agreement Receivers are competent, follow the Safe Work Agreement System, fire-related practices, and JSAs for the primary task.

Competent, in relation to a person, means adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

6.1.3 Harvest Contractors and Subcontractors

a) Ensure their employees are competent and have valid certification and licences:

- Recognize potential fire and explosion hazards related to the work and their assigned responsibilities,
- Identify the fuel, oxygen, and ignition sources at the work site, and

- Safely complete the primary task using the correct fire and explosion hazard controls.

b) Ensure their employees follow the Safe Work Agreement System, EHS standards/ practices, and JSAs for the primary task.

c) Report all incidents (i.e., fires, explosions, leaks, spills) and work site hazards to the Harvest Safe Work Agreement Issuer and/or their Supervisor.

6.1.4 **Safe Work Agreement Receivers** (i.e., the work crew)

a) Report to the Safe Work Agreement Issuer or their supervisor any potential fire and explosion hazard (i.e., electrical arcing, leaks, drips, spills, incidents, and/or unusual conditions) which may occur during the work, and stopping the work if necessary.

b) Know the:

- Fire and explosion hazards including potential fuel, oxygen, and energy sources at the work site,
- Fire and explosion hazards, physical properties, first aid, and preventive measures listed on the SDS,
- Conditions that could create an explosive atmosphere,
- Hazard controls including equipment operating procedures,
- Location of first aid, rescue, and emergency equipment,
- Procedures for emergency response including the type of equipment, the on-site personnel qualified to operate the equipment, and the individual personal protective equipment (PPE) that is required in an emergency, and
- Sound of emergency alarms, evacuation routes, and muster points.

c) Attend all training courses associated with fire and explosion hazards.

d) Share their knowledge with new or transferred workers and providing assistance when and where necessary.

e) Report workers who have unsafe work habits or are not following the instructions of the Safe Work Agreement Issuer, their Work Site Supervisor, or the procedures recorded on the Safe Work Agreement.

6.5 Overview of Harvest's EHS Practices Used to Identify Fire and Explosion Hazards

The following Harvest EHS practices and reference documents should be used to identify potential fire and explosion hazards:

a) Safe Work Agreement System and pre-job hazard assessment process
b) Fire and Explosion Prevention Management Code of Practice and form
c) Fire-related Codes of Practice and Safe Work Practices
d) Harvest's Environment, Health and Safety Manual
e) Job Safety Analyses (JSAs)
f) Safety Data Sheets (SDS's)
g) Manufacturers' Instructions and Specifications

6.6 Training Requirements

The Safe Work Agreement Issuer will ensure all workers who are required to perform work where there is a potential risk of fire or explosion have the necessary training for the task to be performed and understand their assigned responsibilities.

Harvest conducts the following on-the-job fire and explosion prevention awareness training during the work site orientation:

a) Fire prevention and explosion awareness,
b) Safety meeting, Safe Work Agreement System and pre-job hazard assessment process,
c) Identification and classification of all hazardous locations at the work site, and
d) Alarm systems, emergency response, and rescue and evacuation procedures.

6.7 Work Requiring a Fire & Explosion Prevention Plan

The Safe Work Agreement Issuer will decide if a Fire & Explosion Prevention Plan is required based on:

a) The fire and explosion hazards identified during the pre-job hazard assessment process and discussed during the pre-job safety meeting,
b) The level of risk associated with the fire and explosion hazards, and
c) The Safe Work Agreement System.

Note: For most work, the Safe Work Agreement for the primary task by itself will be sufficient, but the Safe Work Agreement Issuer is responsible for deciding if the work requires a written Fire & Explosion Prevention Plan which must be attached to the Safe Work Agreement.

Harvest requires a Fire & Explosion Prevention Plan for all:

a) Drilling, completions, well servicing and testing, or
b) Other work identified by the Operations/Facility Manager.

Depending on the risk for fire and explosion, the following jobs may require a Fire and Explosion Prevention Plan:

a) Non-routine, high-risk work where there is a risk for fire or explosion (i.e., hot work, purging, hot oiling),
b) Electrical work as identified by Harvest's Electrical Department,
c) New facility construction or process equipment installation,
d) New or modified production processes (i.e., Management of Change process),
e) Work requiring bypassing safety shutdown devices, refer to Harvest's Bypassing Safety Devices Safe Work Practice, and

Note: Some complex systems may require a technical review by a specialist before approval is granted to bypass the safety shutdown system.

f) As required by Harvest's Safe Work Agreement System.

Harvest's Safe Work Agreement Issuer may require new or transferred employees and contractors to complete a fire and explosion hazard assessment as part of the evaluation, inspection, and/or audit process.

6.1.5 Examples of Work Requiring a Plan

Examples when Fire & Explosion Prevention Plans may be required include:

1. Well Site Operations

a) Where oxygen-air or oxidizing chemicals are purposely used or inadvertently introduced in well drilling and servicing operations.
b) All snubbing applications.
c) All well work-over applications using hydrocarbon-based fluids.
d) Wire line work using a lubricator.

2. Production Operations

a) Planning and execution of a facility turnaround.
b) Start-up of new equipment.
c) Well in-line testing.
d) Preparation and/or cleaning of tanks and vessels (i.e., confined space entry).
e) Fluid level shots using cartridge style system

3. Repair and Maintenance Activities

a) Modification of vessels, equipment, piping, pipelines that have contained hydrocarbons (i.e., hot work).
b) All operations involving the use of propane torches to heat or thaw systems containing hydrocarbons.

4. Trucking Operations

a) All tank truck repairs and maintenance.
b) All vacuum truck operations involving the removal of hydrocarbon fluids.

6.8 Fire and Explosion Assessment Process

The following process is not intended to be a technical step-by-step, how-to-instructional for all aspects of fire and explosion hazard assessment. Additional information on specific fire and explosion control measures is found in Enform's IRP #18.

The following process is shown on the Fire and Explosion Assessment Process Flow Chart.

1. Identify the existing and potential fire and explosion hazards for the planned operation at the work site.

   a) Identify the on-site sources of fuel, oxygen, and ignition which could be combined to create a fire or explosion. Refer to the Fire Triangle in this COP.
   b) Consider any changing conditions caused by the work procedure which could increase the possibility of these sources combining together.
   c) Review the fire and explosion hazards for any substances listed on the SDS.
   d) Review the work procedures and consider the failure of equipment barriers that:

      - Affect fuel quantity or delivery,
      - Cause oxygen to be added to a closed system, or
      - May introduce a new ignition source.

   e) Review facility or equipment requirements.
   f) Consider previous incidents and past experience.

2. The Safe Work Agreement Issuer will decide if a written Fire & Explosion Prevention Plan is required to supplement the Safe Work Agreement System.

3. Identify the fire and explosion control measures:

    a) Review the control methods for fuel-hydrocarbons, oxygen-air, and energy-ignition sources. Refer to the Potential Control Methods.
    b) Consider the recommended controls found in Harvest's existing practices and the SDS's.
    c) Consider and adhere to any JSA.
    d) Follow the equipment manufacturer's instructions and specifications.
    e) Record the hazard controls on the Safe Work Agreement.
    f) Record the emergency control measures and equipment based on the hazards.

4. Implement the fire and explosion control measures:

    a) Issue the Safe Work Agreement and its supporting documents.
    b) Hold a pre-job safety meeting with the workers responsible for completing the work and ensure they understand the fire and explosion hazard controls and their job responsibilities.
    c) Ensure the workers wear and use the PPE identified during the pre-job hazard assessment process and record this equipment on the Safe Work Agreement.
    d) Ensure workers have the necessary training and qualifications to perform the work.
    e) Notify adjacent workers not directly involved in the work but could be impacted.
    f) Ensure all hazard controls are implemented and that all rescue and emergency equipment are available and ready for quick response.

5. The Safe Work Agreement Receiver will:

    a) Monitor the work or process at intervals that reasonably and practicably prevent the development of unsafe conditions.
    b) Ensure the Safe Work Agreement is completed and all necessary documents are in order for an orderly hand-off to another Work Site Supervisor (shift change) if necessary.

6.9 Critical Risk Factors

The following critical risk factors must be considered when assessing fire and explosion hazards. While the risk of one of these factors may be low, the addition of other factors may significantly increase the risk to unacceptable levels. Refer to Enform's IRP #18.

a) Presence of Liquid Hydrocarbons and Other Flammable Liquids
b) Presence of Hydrogen Sulphide (H_2S)
c) Addition of Hydrocarbon-Based, Workover Fluids
d) Fluid Mixtures with Different Chemical Properties
e) Elevated Operating Pressures and Temperatures

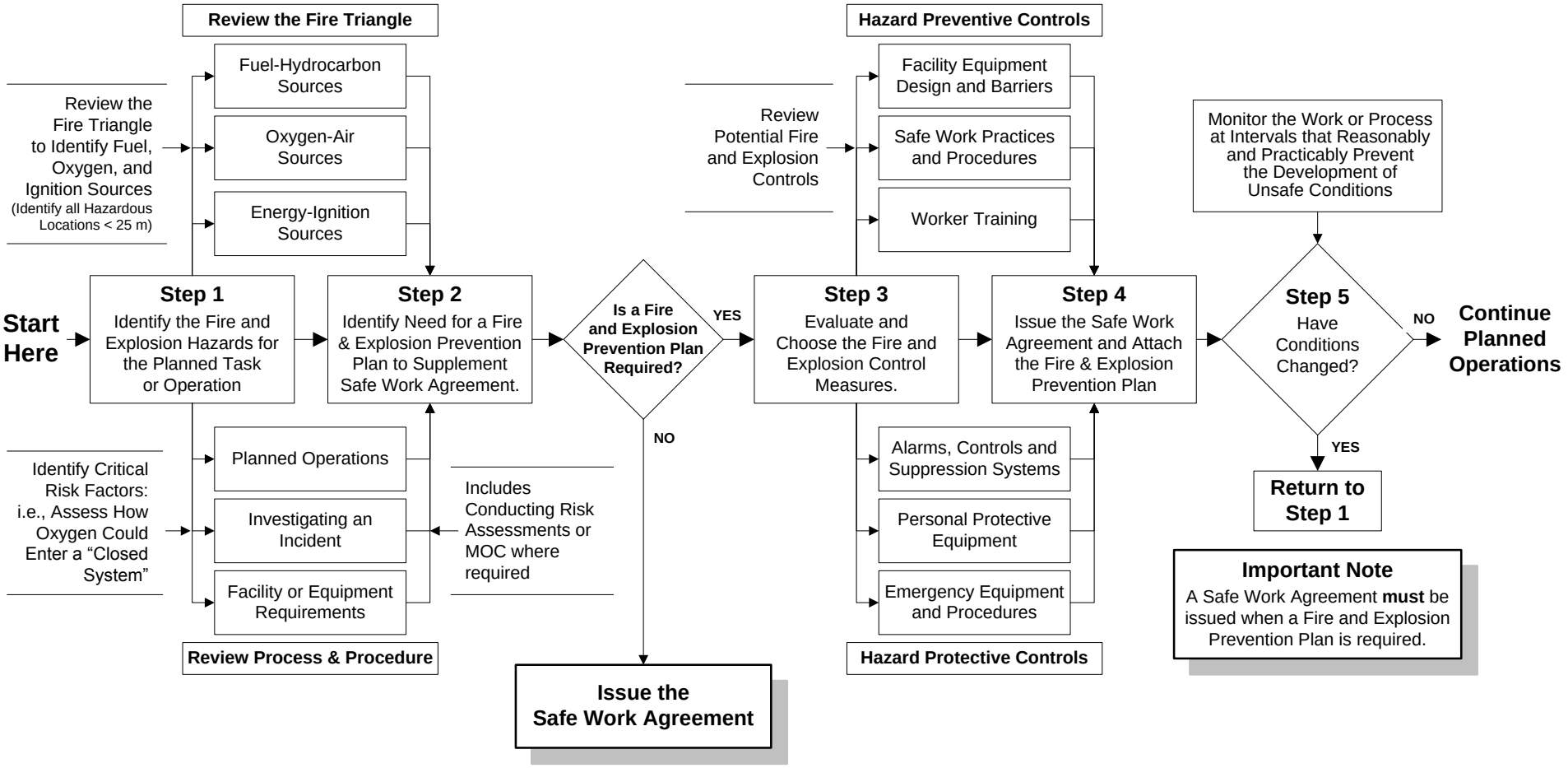
f) Potential for Rapid Pressure or Temperature Changes
g) Flowing Explosive Mixtures into 'Closed' Systems
h) Pre-existing Trapped Air
i) Introduction of air into system

6.10 Reporting and Communicating Fire and Explosion Incidents

All fire and explosion incidents will be reported according to government regulations and Harvest's EHSMS policies and practices which include:

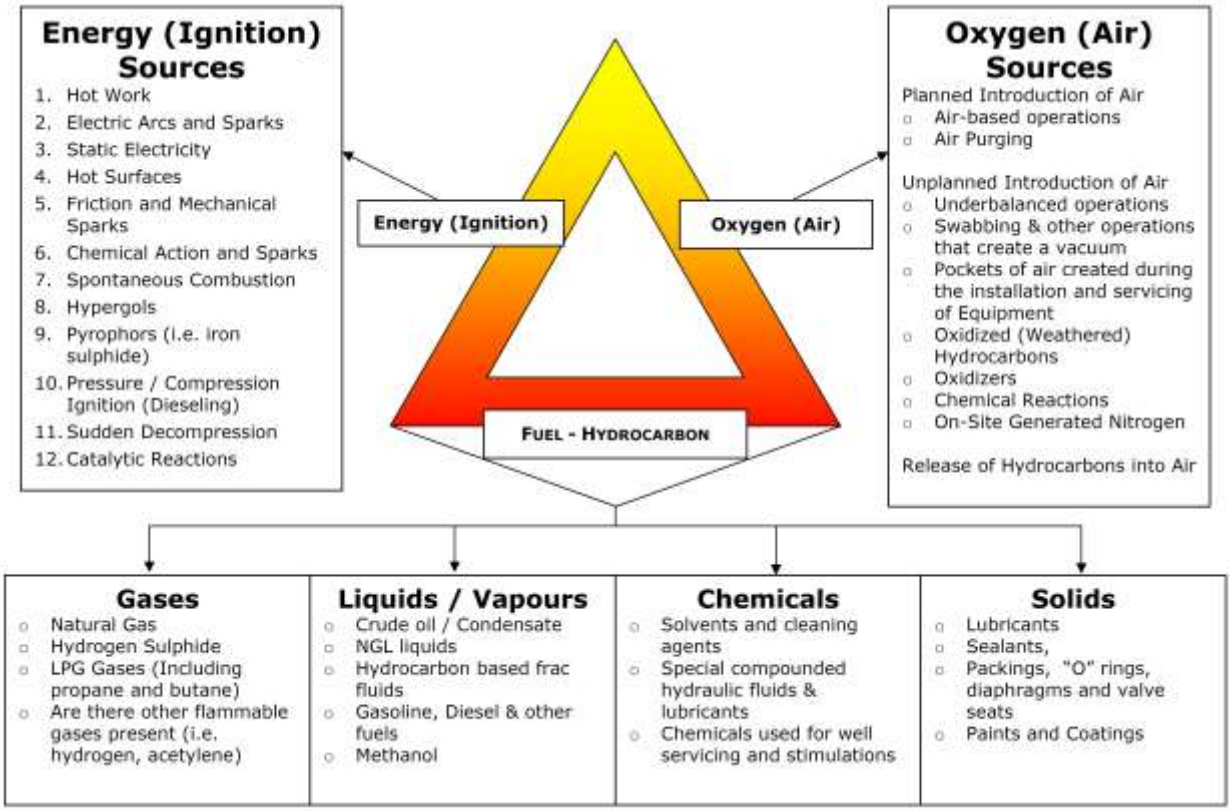
a) Corporate Emergency Response Plan (ERP),
b) Site-Specific Emergency Response Procedures, and
c) Incident Reporting and Investigation Procedures; refer to Harvest's Incident Reporting and Investigation in the EHSMS.

6.11 Fire and Explosion Assessment Process Flow Chart



6.12 Understanding the Fire Triangle

The following Fire Triangle shows some of the different types of possible fuel, oxygen, and ignition sources typically found in the upstream oil and gas industry that have the potential to start fires or form explosive mixtures.



In most situations, by eliminating one side of this triangle, you eliminate the potential for a fire or explosion. However, due to the dynamic nature of drilling, completions, and well-servicing operations, it is not always that straight forward.

The three elements (energy, oxygen and fuel) need to be present in the right amounts and near one another to cause a fire or explosion. Important factors to consider include:

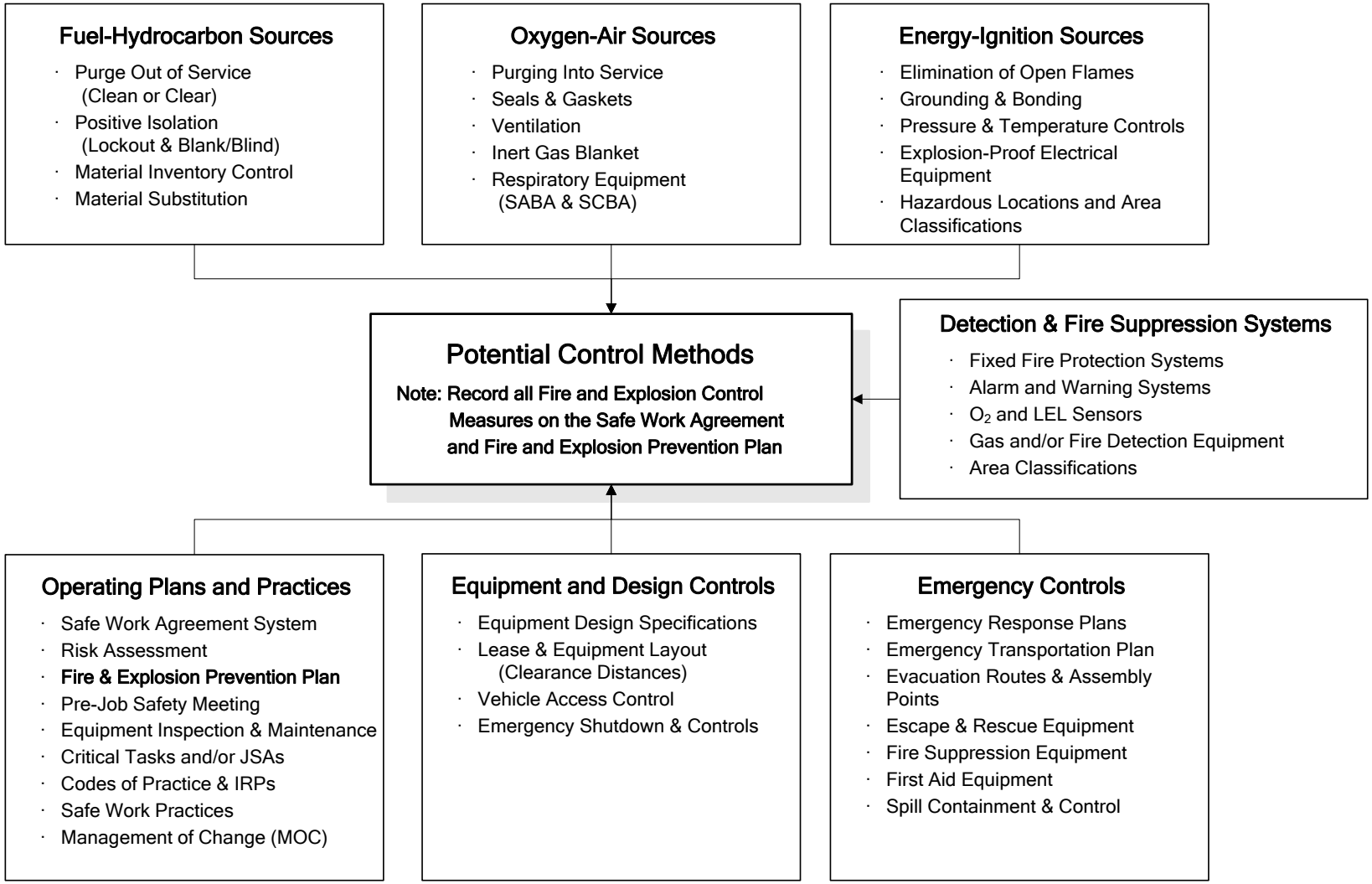
a) Upper/lower explosive limits (UEL and LEL): This is the concentration range of a flammable vapour in air that can ignite.

b) Ignition energy: This is the level of energy required to ignite a flammable mixture. It is affected by temperature and pressure as well as relative humidity.

c) Mixture of fuel sources: Mixing compounds with different chemical properties can result in unique substances with significantly different properties than the original compounds.

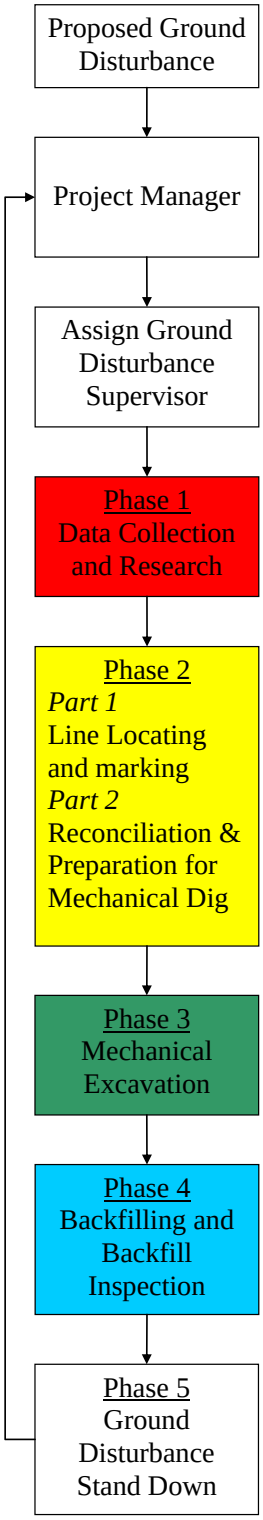
Note: See Section 18.4.2 of IRP #18 for a detailed information on the fire triangle.

6.13 Potential Control Methods



GROUND DISTURBANCE

Ground Disturbance Process Chart



7.0 GROUND DISTURBANCE

The contents of this ground disturbance code of practice have been provided in order of process. All aspects of the guideline are important and must be recognized as such.

Although the information contained in this publication was developed from the most reliable sources, the author(s) assume no liability from use of or non-use of the information, or from errors or omissions.

7.1 Policy

All ground disturbance activities must be conducted in accordance to the Harvest Operations Corporation (Harvest) Ground Disturbance Code of Practice (COP) and local regulations.

7.2 Purpose

The purpose is to ensure all reasonable precautions have taken place to eliminate possible subsurface facility strikes and ensure the safety of all personnel involved in the ground disturbance.

7.3 Definition of Ground Disturbance

Ground Disturbance Defined:

A Ground Disturbance (GD) is defined as any work, operation, or activity that results in a disturbance of the earth greater than 30 cm or any disturbance of the ground over any known or suspected underground facility. This includes without limitation, surveying, excavation, digging, trenching, hydrovacing without locates, pile driving, plowing, drilling, tunnelling, auguring, back-filling, topsoil stripping, land leveling, clearing, reclamation and fencing.

Buried facility warning signs, above ground facilities, previous locate markers, cut-line activity in treed terrain, subtle evidence of buried installations such as graded areas, ground depressions, soil roaches, soil discolorations, and stunted or irregular plant growth must be carefully examined.

Lease and lease road grading that does not reduce ground cover, pounding in wooden survey pegs, pushing in wire survey flags, documented and recently constructed waste storage does not require a GD permit; however a complete and thorough Hazard Assessment must be conducted.

7.4 Responsibilities

7.4.1 Project Manager

It is the responsibility of the project manager (person proposing to create the GD) to:

a) Appoint a GD Supervisor
b) Establish and communicate to the GD Supervisor and/or designate the scope of work applicable to the proposed GD
c) Support in providing the necessary research information to the GD Supervisor for reconciliation
d) Support to ensure all permits, licenses, agreements and approvals are obtained prior to the commencement of any work including non-registered rights-of-way
e) Ensure the GD Supervisor is appropriately trained, and is competent to carry out all ground disturbance activities
f) Provide the GD Supervisor with the current GD COP
g) Review and approve the GD Checklist prior to ground disturbance

7.4.2 Ground Disturbance Supervisor

The Ground Disturbance Supervisor is responsible to:

a) Ensure all permits, licenses, agreements and approvals are obtained and onsite prior to the commencement of any work including non-registered rights-of-way
b) Obtain current GD COP from the Project Manager
c) Determine who the Operating Authority is for the site
d) Obtain a Turnover Agreement from the Operating Authority prior to commencement of any work conducted on-site
e) Complete a Site Specific Emergency Response Plan form. The plan must be posted at the site for the duration of the work and must be reviewed with the workers prior to the start of the work or in the event the ERP is revised
f) Determine if any facilities exist within the area in which they propose to undertake the ground disturbance and 30 metres surrounding the outside perimeter of the ground disturbance. Refer to the Ground Disturbance Diagram, Appendix A
g) Must make the One- Call notification and record ticket number on the Ground Disturbance Checklist. Refer to the Forms Section
h) Reconcile all pertinent information gathered to verify accuracy
i) In congested areas (see definition in this COP), a secondary sweep is required by an alternate Line Locating company
j) The Harvest Pipeline and Facility Record Sheet is required for congested sites. Refer to the Forms Section in the EHSMS.
k) Verify those involved in the GD (on-site) are appropriately trained

l) Complete Harvest GD Checklist and issue appropriate safe work agreements and conduct site specific orientation & hazard assessment and pre-job meetings
m) Adhere to the terms of the Crossing/Proximity/Encroachment agreements
n) Remain on site at the GD location at all times during the GD activities or designate an alternate GD Supervisor if they must leave the site. If delegating an alternate ground disturbance supervisor, competency must be verified.
o) If an alternate ground disturbance supervisor is appointed, notification must be made to the project manager and operating authority.
p) If no alternate is available work must be stopped for the duration of the absence.
q) Must comply with all the applicable provincial and federal regulations
r) Ensure that a backfill inspection is conducted and documented by the facility owner including Harvest facilities. Please refer to the Pipeline Assessment Record on the Asset Integrity Intranet page.
s) Ensure that an updated record of changes or additions to the underground facilities is forwarded to the applicable Harvest field office responsible for the area as well as the Harvest Facilities group.

7.4.3 Worker Responsibilities

The Worker is responsible to:

a) Be aware of and understand the hazards associated with the ground disturbance
b) Participate in the pre-job meeting and follow all instructions.
c) Identify and report hazards to the GD Supervisor immediately
d) Identify and refuse unsafe work
e) Have all required training and orientations; refer to Training Section of this COP.

7.4.4 Underground Facility Owner

An owner of an underground facility who receives notification is required to:

a) Provide any assistance that the party creating the GD may reasonably require to enable regulatory compliance
b) Provide to the person undertaking the GD any information in respect to an underground facility in existence within the dig area and 30 meter search/control areas
c) Locate on the surface of the ground the alignment of the underground facility with clearly distinguishable warning signs and markers at adequate intervals
d) Provide at no cost the locating and marking required by regulation to the person causing the GD

e) Inspect the facility to ensure that the locating and marking have been properly carried out if performed by another party other than the owner before the GD can start
f) Carry out such inspections that are necessary to ensure the continued safety of their underground facility

7.5 Definitions

The following definitions have been defined for the purposes of this code of practice.

Alternate Ground Disturbance Supervisor:

a) Requires the same third party training as the GD Supervisor (Supervisory Level GD training), and must have been oriented to the Harvest Ground Disturbance COP.
b) Fully briefed at the time of designation regarding the status of the job and his/her responsibilities in the absence of the GD Supervisor. The scope of responsibility is limited to GD activities only (e.g. not authorized to issue safe work agreements)
c) Deemed competent by the GD Supervisor to carry out his/her duties in his/her absence

Competent: "Competent", means adequately qualified, suitably trained and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Controlled Area: A strip of land 30 metres wide on each side of a pipeline, or to the edge of the right-of-way, whichever is greater, as per the industry recommended practices.

Crossing / Proximity / Encroachment Agreement: A crossing agreement is an approved legal document. A written document is required any time a GD takes place within another company's (3rd party's) right-of-way, or within 5.0 metres of a facility where there is no right-of-way. A crossing agreement is commonly used as the approval and does not mean an actual crossing is taking place.

Congested area: For the purpose of this COP the term "congested area" includes any of the following and therefore making the task of line locating difficult and suspect:

- Multiple line crossings in the proposed GD area
- Multiple buried facilities in the proposed GD area
- Incomplete historical data
- Incident history
- Any live operating facility

Note: A secondary line locate is required in congested areas.

Ground Disturbance Supervisor (aka Worksite Supervisor): A Harvest employee, contractor, or consultant authorized by Harvest and deemed competent to supervise a GD. Must be trained to the highest industry standard in GD and be oriented to the Harvest GD COP.

Directly Supervise: The supervisor must be positioned such that they are in the direct line of sight of the mechanical excavation; i.e. can you see the equipment operator, spotter and the exposed line and can you communicate with equipment operator and spotter.

Hand Exposure: Any non-destructive techniques acceptable to the facility owner, such as hand shovelling or hydrovacing.

Hand exposure/dig Zone: The distance from the locate marks within which mechanical excavation equipment shall not be used until the buried facility has been hand exposed. Under the Alberta Pipeline Act and Regulation, the hand expose zone for pipelines is 5 m. For federally regulated pipelines, the hand expose zone is 3m. For all other types of buried facilities, the hand expose zone is 1m.

Notification:

a) **Controlled Area:** Provincially regulated Pipelines: Every owner of an underground facility found within 30m either side of the provincially regulated pipeline or to the edge of the right-of-way, whichever is greater must be notified of the nature and schedule of the ground disturbance.
b) **Safety Zone:** Federally Regulated Pipelines: Every owner of an underground facility found within 30m of the pipeline right-of-way area must be notified of the nature and schedule of the ground disturbance.

Notification must be done a minimum of 2 working days and a maximum of 10 working days in advance, or as specified in the crossing agreement.

Operating Authority: The Operating Authority is the individual to whom Harvest has delegated immediate control and accountability for all operations on a specific worksite.

Safety Zone: Federal Regulations define the ‘Safety Zone’ as 3m on either side of the right-of-way, regardless of the width of the right-of-way.

Search Area: The search area is an additional 30m beyond the perimeter (limits) of the ground disturbance (dig zone). If the dig zone expands the search area expands accordingly.

Underground Facility: Any structure located below the surface of the ground. An underground facility could include but is not limited to a telephone or power cable, conduits, fiber optics, water service, or pipelines carrying a variety of products, a fixed structure such as a cement piling, cathodic protection ground beds, building foundation or underground tank.

7.6 Training

Project Managers must have completed:

a) Harvest Level 4 Orientation
b) Harvest Ground Disturbance COP Orientation (orientations are valid for 1 year)
c) On-site review of the Harvest Ground Disturbance Code of Practice

A Ground Disturbance Supervisor, Alternate Ground Disturbance Supervisor must have completed:

a) a valid certificate is Supervisory Level Ground Disturbance
b) Harvest Level 4 Orientation
c) Harvest Ground Disturbance COP Orientation (orientations are valid for 1 year)
d) On-site review of the Harvest Ground Disturbance Code of Practice

Note: In the event Equipment Operators and/or Spotters are assigned the role of Alternate Ground Disturbance Supervisor they must adhere to the above training requirements.

All workers involved in ground disturbance activities must receive an on-site review of this COP. This orientation must include:

a) Roles and responsibilities
b) “Stop work” mandate
c) Provision of the code of practice for reference

7.7 Process Guide

The Project Manager will assign a GD Supervisor and confirm the scope of work for the proposed GD.

A GD must be completed in accordance with the process flow diagram and therefore each phase must be completed prior to progressing to the next phase. Refer to Table 1 - Ground Disturbance Process Chart in this COP.

7.8 Phase 1 - Data Collection and Research

For all GDs, it must be confirmed whether or not underground facilities exist within the limits of the proposed GD (dig area) and the search area (30m zone beyond the dig area). This is to be done by document search; electronic line location and marking, and the reconciliation of all data.

Before Phase 2 of the GD begins, the GD Supervisor must obtain and/or assemble a document package including:

a) Copies of all research information that must be readily available on site

b) Completed Phase 1 of the Ground Disturbance Checklist
c) Appropriate authority to work

The following sources must be referenced, if available, and reconciled to ensure all underground facilities have been accurately identified:

a) Company Maps & Plat/Plot Plans – The Company should have records of their own pipelines and facilities for leases and pipeline rights-of-way that show; location, depth, alignment and type of line (pipeline, cable, conduit, etc).
b) Provincial and Federal Oil & Gas Regulators

Plans showing registered pipelines may be available and can be obtained.

Note: Lines are not always exactly as shown.

c) One-Call Systems – where operational, provide a computerized system to advise and help the party undertaking the GD. However, not all companies are members of One-Call Systems. Companies identified as not being on the One Call system must be notified verbally followed by written documentation.

- Alberta 1-800-242-3447 www.alberta1call.com
- British Columbia 1-800-474-6886 www.bconecall.bc.ca
- Saskatchewan 1-866-828-4888 www.sask1stcall.com

Note: BC & Saskatchewan have a limited number of registered facility owners participate in the one call system.

d) Area Operations Personnel – Area Foreman or their designate must be notified of all proposed GD. Experienced Company personnel familiar with the area operations may be knowledgeable of pipelines or utilities not otherwise documented and should be consulted.
e) Land Titles – If applicable, land titles will show caveats of lines and utilities on the property.
f) Landowner – If applicable, landowners may have knowledge of buried utilities not documented elsewhere, especially if they have installed it themselves.
g) Visible Markers - Check the proposed work area for pipeline and utility markers. Cross reference with the contact list and ensure the company named has been contacted for additional information.
h) Rural Gas Utilities - There are several maps available that provide essential information on Rural Gas Utilities commonly referred to as Gas Co-ops (contact the local branch).

A written approval and schematic indicating the location of buried facilities from all 3rd parties in your work area is required.

7.8.1 Notifications/Crossing / Proximity / Encroachment Agreements

1. Before creating a GD on any 3rd party facility within a right-of-way or within 5.0m of a pipeline where there is no right-of-way, a written approval (Crossing / Proximity / Encroachment Agreement) is required and must be present at the worksite. The agreements must be read and understood at the site level.
2. Foreign facility owners must be notified a minimum of 2 working days and not more than 10 working days before the commencement of the GD.

    a) Controlled Area: Provincially regulated Pipelines: Every owner of an underground facility found within 30m either side of the provincially regulated pipeline must be notified of the nature and schedule of the GD.
    b) Safety Zone: Federally Regulated Pipelines: Every owner of an underground facility found within 30m of the pipeline right-of-way area must be notified of the nature and schedule of the GD.

3. If requested by the person creating the GD, the owner of a pipeline must be present at the time the buried facility is exposed. If the pipeline owner declines the invitation to attend, this refusal must be provided in writing to the GD Supervisor.
4. When the owner of an underground facility inspects a facility prior to the GD, for locating and marking purposes, he/she must make and provide a written record of this inspection.

5. The GD Supervisor must note the following critical information:

    a) Physical support requirements for exposed facilities.
    b) Distances that must be maintained between underground facilities.
    c) Notification time frames to owners of underground facilities, if different from regulations.
    d) Distance that must be maintained with mechanical excavation equipment, if different than regulations.
    e) Backfill inspection requirements

6. Crossing / Proximity / Encroachment Agreements are legal documents and all changes must be in writing and signed by the same parties who signed the original agreement.
7. The Company does not require a Crossing / Proximity / Encroachment Agreement if they are crossing their own underground facilities, although they must identify and follow the above information for each crossing.

7.9 Phase 2

In this phase the GD Supervisor ensures that all the requirements in Phase 1 are completed. Ensure all documented underground facilities are located, marked and exposed as required. Any facilities suspected within the 30m search area that are not documented or identified during research must be reconciled on surface and exposed as required. The GD Supervisor must conduct and complete a hazard assessment and verify all permits are in place and all workers involved in the GD have been orientated to this COP.

7.9.1 Part 1- Line Locating and Marking

Line locates are only valid for 14 days in AB & SK, and 10 days in BC.

1. Line Locator's Responsibilities:

a) Confirm:

- Authority to proceed Harvest's contact information, including phone and emergency numbers
- Worksite location and directions
- Size and scope of project

b) Locate and mark all underground facilities indicated by research (documented facilities)

- Check that line locating equipment is fully functional (i.e. fully charged batteries and calibrated) and is operated by properly trained, competent personnel.
- Perform conductive (directly connected) search for known underground facilities wherever connections are possible (preferred method)
- Perform inductive search for known underground facilities
- Mark and identify all located underground facilities within 30m of the outer extent of the proposed ground disturbance area

c) Search for and mark suspected (undocumented) facilities

- Look for obvious clues such as buried facility warning signs, above ground facilities, previous locate markers, as well as cut-line activity in treed terrain. Subtle evidence of buried installations such as graded areas, ground depressions, soil roaches, soil discolorations, and stunted or irregular plant growth must be carefully examined.
- Perform inductive blind sweep extending a minimum of 30m from outer extent of the proposed GD area. This will

normally consist of four separate grid pattern sweeps or equivalent, of the area to establish the location of any unknown lines or objects.

- Mark and identify all located underground facilities within 30m of the outer extent of the proposed GD area.
- In the event the 30m search area entails sections in which it is not practical to conduct a line sweep (e.g. private farmland, forested area) and there is no intention to excavate in this area the line sweep may be exempted under the following conditions:

  - The drawings do not indicate the presence of any under ground facilities in the area to be exempt.
  - One-Call has been contacted and has no record of under ground facilities in the area to exempt.
  - The exemption has been reviewed by the designated GD Supervisor and the project manager, and both have signed off on the exemption.

- If, during the search, other facilities are found, identify them and inform the GD Supervisor.

Caution: Electronic locating equipment locates the presence of electromagnetic signals and has limitations. It is not a 100% accurate tool for pipe and utilities location, no matter what the level of training or the quality of equipment.

It is only possible to locate an electromagnetic signal (or signature) from a buried facility if it is a conductor. The only sure way of identifying a buried structure is by hand exposure. Several factors like the presence of other pipes or cables, soil salinity, soil moisture, existing grounding or cathodic beds, over hanging fences, pipe racks, electrical lines, rock or pavement overburden, or a random curved alignment of the buried structure can impede or confuse the signal. These items must be noted as sources of signal contamination. If an underground facility signal is lost in a dig zone, it must be fully located and reconciled to the extent of the ground disturbance area.

2. Markers identifying underground facilities will:

a) Be marked with appropriate colored surveyors tape to a stake driven less than 30cm, or a wire flag, paint or chalk conforming to the international colour code for buried structures:

- Electrical – Red
- Gas & Oil – Yellow
- Communications – Orange
- Sewers – Green
- Water – Blue

- Reclaimed water, irrigation and slurry lines - Purple
- Survey Markings – Pink
- Proposed Excavation – White

b) Be spaced not more than 5.0m apart or, where pipes follow a curve; be spaced so that the curvature is clearly visible.
c) Underground facility markers will be positioned directly above the centerline within the 30m search zone.
d) Form a cross consisting of two stakes at the points where the existing pipeline centerline and the foreign crossing right-of-way intersect.
e) Have clearly marked the owner's name on each pipeline marker or on the plot plan.

3. Record all Findings:

a) Complete a locate map for the area
b) If requested, record GPS position data and produce a detailed map to scale.

4. Review with the GD supervisor:

a) Provide GD Supervisor with a copy of the updated working drawings.
b) Pipeline plots, drawings, legal documents, etc
c) As built, pipeline maps, plot plans, etc
d) Landowner and Operations Personnel knowledge (re: underground facilities that he may have installed and/or knows of).
e) In congested areas, a secondary sweep is required by an alternate Line Locating company
f) All construction drawings must be marked-up clearly indicating any corrections, changes, uncertainties or difficulties locating any buried facilities. Indicate any changes with a highlighted "CAUTION" box and arrow.
g) Report all concerns, uncertainties and anything unusual or out of the ordinary to the GD Supervisor immediately to avoid any possible accidents.

5. Underground Facilities unable to be located:

In the event there are known lines that can not be located (validated) the following must occur:

The GD Supervisor must:

a) Stop Work
b) Consult the Project Manager

c) Conduct Hazard Assessment and implement Controls such as:

- Conduct second line sweep with alternate Line Locating company
- Slotting with hydrovac must be completed in accordance with part 2 noted below.

7.9.2 Part 2 Reconciliation and Prep for Mechanical Dig

1. Potential Hazards and Hazard Assessments

When preparing to conduct ground disturbance activities (including hydrovacing) the following hazardous conditions or events must be considered and mitigated.

a) Corrosion or deterioration due to minor nicks and gouges
b) Ruptures
c) Fires and explosion
d) High pressure jetting
e) Release of toxic substances
f) Electrocution
g) Overhead power line contact including arcing
h) Cave-in or slides
i) Communication system interruption
j) Utility service interruption
k) Environmental liabilities

It is the responsibility of the GD Supervisor to conduct a site specific orientation & hazard assessment, communicate the hazards to the workers and ensure the appropriate controls have been implemented, and all applicable approvals have been obtained.

Note: If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.

2. Undermining Structures or Foundations:

If the ground disturbance is with in 3m of a structure or foundation Harvest Facilities Engineering must be consulted. This must also include provisions for back-filling requirements.

3. Underground Facilities within the 5.0m radius:

a) The GD Supervisor must be at the GD site whenever the ground is to be disturbed, including hydrovacing, hand exposure and digging.
b) All underground facilities within a 5.0 metre radius of the proposed GD area (dig area) must be exposed (day-lighted) by non-

destructive techniques acceptable to the facility owner. The exposure must be completed before mechanical excavation begins. All underground facilities must be exposed at appropriate intervals to positively confirm the location, line size and alignment.

c) Hydrovacing can cause damage to coatings, cables and pipes (plastic and steel) therefore extreme caution must be exercised. Probe pressure must be regulated so that coatings, cables or pipes are not damaged and in the case of electrical wires it does not cause an electrical hazard.

d) Hand-exposed and/or hydrovaced trenches should be 0.5m deeper than the intended depth of excavation to confirm any lines situated below are not contacted. The holes must be large enough and adequately spaced to confirm line size and alignment (watch for underground facilities that have 90 degree turns or field bends).

4. Working In Proximity to Electrical Hazards

For all work in the vicinity of electrical hazards, a hazard assessment must be conducted that takes into account:

a) The likelihood that electrical cables can be looped in a short radius
b) Electrical cables can be damaged with hydrovac tools

When hydrovacing around electrical cables or lines, refer to the hydrovacing companies' specific procedures.

If work is being conducted within 30m of an overhead power line, refer to the EHSMS Overhead Power Lines SOP.

5. Working in Proximity to Operating Pipelines

Exposing operating pipelines can introduce unforeseen risks to persons, property and the environment and extra caution must be taken. Under this code of practice, pipe shall not be exposed by any means (mechanical or hydrovac) in excess of 4 metres in linear length. If larger spans are to be exposed, the line must be depressurized or an authenticated engineering assessment and risk analysis must be completed and followed.

Note: Pipelines that were depressurized for ground disturbance work shall be fully backfilled before restart.

6. Isolation Points

Prior to mechanical excavation, the GD Supervisor must identify any isolation points and the procedures to be followed in the event of an emergency.

It may be necessary to isolate sources of energy in order for work to safely proceed e.g.:

a) Mechanical motion
b) Potential energy due to pressure, gravity or springs
c) Electrical or thermal

Refer to Harvest Energy Isolation SOP, the Lockout - Tagout (Zero Energy) for more information.

7. Confined Space

"Confined space" means a restricted space which may become hazardous to a worker entering it because of:

a) an atmosphere that is or may be injurious by reason of oxygen deficiency or enrichment, flammable, explosive, or toxicity,
b) a condition or changing set of circumstances within the space that presents a potential for injury or illness, or
c) the potential or inherent characteristics of an activity which can produce adverse or harmful consequences within the space;

If it is determined that work will be conducted in a confined space refer to EHSMS Confined Space Entry COP.

Progression to Phase 3 is not permitted until Phase 2 of the check list is fully completed and the required sign-off and approvals are obtained.

7.10 Phase 3 - Mechanical Excavation

Mechanical excavation equipment cannot be used within 60cm of the exposed facility except under the direct supervision of a representative of the owner of the facility. If a greater distance was stipulated in the Crossing / Proximity / Encroachment Agreement, it must be followed.

Mechanical excavation within 60cm of electrical cables will require the de-energizing of the cable or line.

When mechanical excavation equipment is being used within 5.0m of an underground facility the GD Supervisor or a designated alternate must directly supervise the GD activity.

All excavations and trenches must meet Provincial Occupational Health and Safety regulations as a minimum.

Contacting an Underground Facility:

Contact with an underground facility can be defined as:

- Puncture or crack in the facility, scratch, gouge, flattening, or dent of the surface, or,
- Damage to the protective coating.
- Fiber optic cable damage entails severing, bending or kinking.
- Damage by Hydrovaccing

If contact with an Underground Facility occurs:

- The GD work shall be immediately terminated
- The party performing the ground disturbance must immediately notify the owner of the facility, the location where the contact occurred, and the kind of damage that resulted from the contact.
- If the facility is a pipeline; the owner must immediately notify the required agencies and regulatory bodies of the location where the contact occurred, and the kind of damage that resulted from the contact.

In cases where the ground disturbance has been terminated due to contact, the GD cannot be started again without written approval of Harvest (EH&S and Asset Integrity Managers), the owner and applicable regulatory agencies.

7.11 Phase 4 - Backfilling and Backfill Inspections

a) The GD Supervisor must directly supervise (direct line of sight of the backfill; i.e. can you see the equipment operator, spotter and the exposed line and can you communicate with equipment operator and spotter) the backfilling activity or assign a competent GD alternate. The GD Supervisor and workers must be aware of alignment and depth of the underground facility.

b) A party that exposes any part of an underground facility shall notify the owner at least 24 hours prior to backfilling. Upon being notified, the facility owner must inspect the exposed part of the underground facility to ensure no damage has occurred.

Note: For all backfills of HOC owned underground facilities, a HOC representative must attend the backfill and complete required documentation.

c) If the owner does not inspect their underground facility, the GD Supervisor must prove that all reasonable efforts have been made and documented to procure a backfill inspection from the owner. Failing this, the GD Supervisor and/or 3rd Party must conduct the backfill inspection, utilizing the Harvest Pipeline Assessment Report and taking appropriate pictures.

d) Backfill material will normally consist of the clean spoil removed from the excavation during exposure operations with appropriate measures to prevent damage to the underground facility (e.g., removal of large rocks, etc.).

e) All hydrovac test points must be properly backfilled as noted above.
f) The GD Supervisor should ensure that all the locate stakes and flags are removed when the work is completed.

Undermining Structures or Foundations

If the GD is within 3m of a structure or foundation Harvest Facilities Engineering must be consulted. This must also include provisions for backfilling requirements.

7.12 Phase 5 - Ground Disturbance Stand-Down: Record Keeping

All documentation associated with GD must be submitted to the Project Manager and retained for a minimum of 2 years.

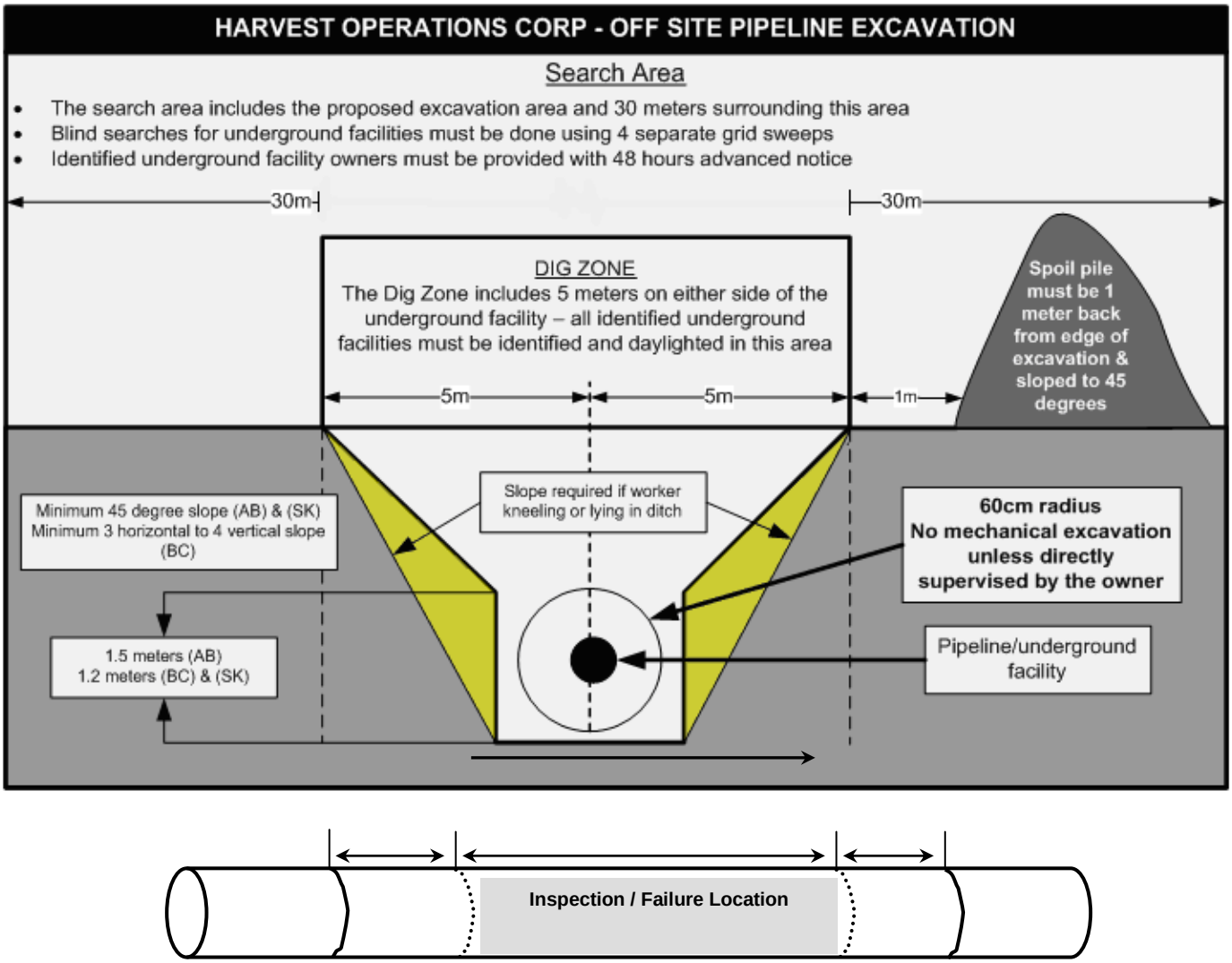
This includes but not limited to:

a) Ground Disturbance Checklists
b) Crossing / Proximity / Encroachment Agreement
c) Line Locate Documentation
d) Pipeline Assessment Record
e) Pipeline and Facility Record Sheet
f) Transmittal records if changes were sent to survey company for revisions
g) Harvest Operations turn-over and safe work agreements
h) Line Locating equipment Calibration records

7.13 References

1. CAPP Safety Guideline for Ground Disturbance and Damage Prevention (IRP 17)
2. Alberta Energy Resources (AER): Safe Excavation Near Pipelines
3. Provincial Pipeline Acts & Regulations
4. Federal National Energy Board Regulations
5. CSA-Z662 Standards
6. Safe Procedures for Pipeline & Utility Crossings Manual
7. Workers Compensation Board & Workplace Health & Safety Regulations

Appendix A Ground Disturbance Diagram



HEARING CONSERVATION

8.0 HEARING CONSERVATION

8.1 Introduction

The purpose of this Code of Practice (COP) is to ensure that individuals entering and/or working in a Harvest Operations Corp. (Harvest) facility or lease are not overexposed to noise and thereby reducing the potential for hearing loss due to noise exposure. This Guideline complies with the Provincial OH&S requirements for Hearing Conservation Programs in BC, AB & SK.

Engineering controls are the primary method to reduce noise. Personal Protective Equipment (PPE) is considered to be used as a last resort when no other controls are practicable, and where noise exceeds permissible levels.

Regular audiometric testing results show that employees have and continue to suffer work related hearing loss. Harvest remains committed to reducing the risk and/or effects of over exposure to excessive noise. Harvest's primary focus is to reduce noise levels in facilities wherever possible and secondly, to ensure personal hearing protection is adequate, available and used properly.

Hearing losses may not be significantly noticeable immediately, however, over time the losses may become more severe. Hearing loss is permanent and irreversible.

8.2 Personal Hearing Protection

a) Wearing of hearing protection is strongly recommended for all individuals entering a Harvest facility or lease regardless of whether or not hearing protection signs have been posted. The exceptions to this are as follows:

- Offices and control rooms,
- Inside covered motor vehicles,
- Areas such as labs, technical shops, maintenance areas / shops, etc. may be exempt provided testing and noise level in the specific area has been determined to be below the minimum 85 dBA

b) Hearing protection is mandatory and must be worn at all times in all areas with noise levels above 85 dBA.

c) All individuals entering an area with noise levels above 85 dBA and below 95 dBA shall wear hearing protection. Ear plugs are to be worn as the primary form of hearing protection as, when properly inserted, they provide the most effective noise reduction protection.

d) Where noise levels have been recorded at or above 95 dBA, double hearing protection must be worn. In addition to ear plugs, ear muffs must be worn.

Note: Most ear muff models worn with safety glasses are not considered to give adequate protection because of the potential for eye glass frames to break the muffs' seal. Muffs designed for use with glasses may be considered.

e) Harvest encourages workers to utilize personal hearing protection off the job as well as on the job. Depending on the off the job life style activities and duration of these activities these can contribute significantly to hearing loss without the use of proper hearing protection.

8.3 Noise Surveys

In order to minimize any effects from exposure to workplace noise, Worksite Supervision will ensure indoor and outdoor noise surveys are conducted by a qualified person, for all locations under their area of responsibility as a minimum of once every five years, or immediately after process, equipment or design changes have been implemented.

Results of the noise survey(s) must be recorded and maintained for the specific site or lease.

8.4 Signage

All locations within the site and/or lease with identified noise levels above 85 dBA shall have hearing protection warning signs conspicuously posted.

Signage will indicate whether single (ear plugs) or double hearing (ear plugs and muffs) protection is required. Signage that is placed on or in close proximity of building entrances shall be installed in such a manner that they are visible if and when doors are opened to prevent individuals from inadvertently entering the building without the proper hearing protection. An example of this would be hearing warning signs on both sides of the door.

8.5 Engineering Controls

Facility Engineering shall review all projects to consider the practicality of installing the quietest equipment or as a minimum, reduce workplace noise levels to below 100 dBA.

Existing sites should also be investigated by the Worksite Supervisor, in conjunction with engineering to evaluate the practicality of implementing engineering controls to reduce the noise level as low as reasonably practicable.

8.6 Audiometric Testing

a) In order to determine the effects, if any, on workers, audiometric tests shall be performed on all field personnel who, based on their work activities, are or have the potential of being exposed to workplace noise. Testing has to be done annually in BC and every two years in AB & SK, after the baseline test. This testing is performed by a 3rd party, and all testing results are confidential. Individual results will not be divulged without the informed consent of the employee.

b) Should an Early Warning Shift (EWS) or Abnormal Shift (AS) be detected, Health Services will ask the employee for their informed consent to divulge their test results. Once the employee provides their consent, the test results will be provided to selected personnel who may assist in the investigation to determine the root cause of the source of the hearing loss.

Note: Audiometric testing is conducted by measuring at what decibel (dB) a person hears at certain frequencies. A certain amount of hearing loss can be expected from activities outside work and from aging. Audiometric test results are corrected to these factors.

c) An Early Warning Shift (EWS) is defined as a hearing loss of 15 dB in any one frequency from when a baseline was established. A person's first audiometric test may be a baseline. Another baseline is after an EWS has been recorded.

d) This means that a person with two EWS in the same frequency has lost 60 dBA of hearing since his first baseline. It also means that the person has lost 90 dBA since birth. Remember that only hearing losses of more than 30 dBA are considered noise induced hearing loss.

e) An Abnormal Shift (AS) is defined as a hearing loss of 30 dB in any one frequency from when a baseline was established. This usually occurs within one to two years. It is a very severe hearing loss.

8.7 Program Evaluation

The Hearing Conservation Program will be evaluated periodically by the EH&S Group to determine the overall effectiveness of the Hearing Conservation Program.

The following criteria should be used to evaluate the program:

a) Confirmed Early Warning Hearing Threshold Shifts should be less than 3% of the noise exposed personnel per year,

b) Confirmed Abnormal Hearing Threshold Shifts should be 0% of the noise exposed personnel, and

c) Hearing losses of 10 dB or more should be less than 3% of the noise exposed personnel per year.

Results of the evaluation will be brought to the attention of the Superintendents and Manager.

8.8 Summary

a) Employees are required to wear hearing protection at all times, unless directed otherwise, while on all leases or plant sites with noise levels above 85 dBA.

b) Plugs and Muffs are required in areas with noise levels above 95 dBA. Note that most ear muff models worn with safety glasses are not considered to give adequate protection because of the potential for eye glass frames to break the muffs' seal. Muffs designed for use with glasses may be considered.

c) Hearing protectors such as muffs and ear plugs can only provide in real life applications, on average; about 10 to 14 dBA attenuation. This is because all hearing protectors do not fit everyone and sometimes they are not worn or inserted correctly. This means that at best, single hearing protectors can only protect someone in noise up to 97 to 100 dBA.

d) Wearing two hearing protectors, muffs and plugs, can provide an additional 5 to 7 dBA attenuation. This will allow a person to work safely up to 104 to 107 dBA depending on the protector models used.

e) Some equipment (e.g. large compressors & coolers) generate noise up to 114 dBA or more. In these situations, the only control is to limit worker exposures as much as possible because hearing protection alone is not adequate.

f) It is important to understand that people who are identified with EWS and AS have experienced an irreversible, permanent injury. These losses may become a disability which affects their quality of life and may become compensable.

g) All audiometric testing results are privileged information. Individual results will not be divulged without the informed consent of the worker. Supervisors will receive group results and other non-identifying information.

h) Facility Engineering will install the quietest equipment practicable and investigate means of reducing noise from existing equipment generating more than 100 dBA.

i) Employees are encouraged to take home PPE to use at home or during recreational activities.

HOT WORK

3.2.9 HOT WORK

3.2.9.1 Welding & Cutting – Safety Considerations

***Forms currently under development.**

WELDING & CUTTING - SAFETY CONSIDERATIONS

1.0 WELDING & CUTTING - SAFETY CONSIDERATIONS

1.1 Introduction

Welding and cutting is routine practice throughout industry that presents significant risk to people and equipment. This Code of Practice (COP) does not include technical welding specifications for the fabrication of equipment, structure, piping, the testing of welders, welding techniques, or the inspection and testing of welds.

1.2 Policy

This Welding & Cutting – Safety Considerations COP shall apply to all operations or maintenance activities on Harvest Operations Corp. (Harvest) work sites including Production Operations, Drilling, Completions and Construction. Any operational, maintenance or construction-related task that involves welding and cutting must incorporate the minimum requirements outlined in this COP

Welding and cutting operations will be conducted by contractors who specialize in this type of work and have been approved via the Contractor Engagement System. The welding contractor shall use only competent, certified welders appropriate to the type of welding to operate welding and cutting equipment.

Note: A Safe Work Agreement (hot or cold) must be issued when welding or cutting.

1.3 Regulations and References

The Welding & Cutting – Safety Considerations COP is based on the following codes and regulations. However, Managers and Supervisors must remain knowledgeable and current with industry best practices.

1. Alberta Occupational Health and Safety Code (2009) Parts 2 and 10
2. BC Occupational Health and Safety Regulations (2010) Parts 8, 9, 12 and 23
3. Saskatchewan Occupational Health and Safety Code (2009) Part 25
4. Harvest Fire and Explosion Hazard Management and Hot Work Codes of Practice
5. Harvest Fire Extinguisher and Fire Prevention Safe Operating Practices
6. CSA Standard W117.2-94, *Safety in Welding, Cutting, and Allied Processes*
7. Code for Electrical Installations at Oil and Gas Facilities (2006)
8. Canadian Electrical Code

1.4 Regulatory Requirements and Occupational Exposure Limits

1. The Alberta Occupational Health and Safety Code (Part 10, Section 171.1(3)) "Fire and Explosion Hazards" in part states:

An employer must ensure that, before a welding or allied process is commenced, the area surrounding the operation is inspected and

a) All combustible, flammable or explosive material, dust, gas or vapour is removed, or
b) Alternate methods of rendering the area safe are implemented.

Welding or allied process means any specific type of electric or oxy-fuel gas welding or cutting process, including those processes referred to in Appendix A of CSA Standard W117.2-06, Safety in Welding, Cutting, and Allied Processes.

2. The British Columbia OHS Regulation (Part 12, Section 12.112) Welding, Cutting and Allied Processes in part states:

Welding, cutting and similar processes must be carried out according to the requirements of CSA Standard W117.2-06, Safety in Welding, Cutting, and Allied Processes.

3. The Saskatchewan OHS Regulation (Section 373 Part 25) Gas Burning or Welding Equipment states:

Where gas burning or welding equipment is in use, an employer or contractor shall ensure that:

a) Approved flashback devices are installed on both hoses at the regulator end, and
b) Acetylene and liquefied gas containers are used and stored in an upright position.

A worker shall shut off the container valve and release the pressure in the hose when the worker has finished with any gas burning or welding equipment and is not likely to use it within the next 2 hours.

Note: This practice has been designed to account for and incorporate procedures that will meet interprovincial requirements. However, management and supervisory personnel, who are responsible for supervising welders, must remain knowledgeable and current with government regulations.

1.4.1 Occupational Exposure Limits (OELs)

In Alberta, British Columbia, and Saskatchewan, no worker shall be exposed to a substance (i.e., fumes released by the process, the parent metal or electrodes) that exceeds its 8-hour occupational exposure limit (OEL), the ceiling limit, short-term exposure limit, or 8-hour TWA limit prescribed by ACGIH at any time.

Note: In Saskatchewan, the 8-hour OEL for welding fumes is 5mg/m^3.

1.5 Responsibilities and Duties

1.5.1 Superintendents, Field Foremen, Supervisors, and/or Designated Alternates

a) Ensuring the Welding & Cutting – Safe Considerations COP and other practices (i.e., hot work, fire prevention, fire extinguishers) are implemented and followed at all Harvest facilities and work sites under their supervision.
b) Ensuring relevant training has been provided to workers who are required to supervise welding contractors, handle/store gas cylinders, or to perform the task of Fire Watch.
c) Ensuring that the risks of welding and cutting are assessed, and controls (i.e., engineering, administrative or PPE) are implemented where necessary.
d) Ensuring that contractors are approved via the Contractor Engagement System (ComplyWorks).
e) Ensure a SWA for welding and cutting is issued in compliance with the SWA.
f) Ensure Harvest Work Site Supervisors that are issuing Safe Work Agreements for welding and cutting are appropriately orientated and trained in accordance with Harvest's orientation and training requirements.
g) Ensuring adequate documentation (e.g. SWA, fire explosion plan) is prepared and maintained by a competent person.
h) Conducting routine safety checks, inspections or audits to ensure welding and cutting procedures and other hazard control measures are being followed.
i) Ensure welders performing work on pressure vessels and piping follow the applicable Quality Control Manual approved by the provincial authority or regulator (e.g., Alberta Boilers Safety Association).

1.5.2 Work Site Supervisor

a) Ensuring a Safe Work Agreement for welding and cutting is issued. This must include a fire prevention plan and site specific emergency response plan.

b) Ensuring that SDS's are available at the work site and labelling of compressed gas cylinders is being followed as required under the WHMIS and TDG Regulations.
c) Ensuring each welding contractor has a valid journeyman welder's certificate and the necessary qualifications and tickets relevant to the assigned task.
d) Designating a Fire Watch to monitor the welding and or cutting as required (as per the hazard assessment)
e) Ensuring proper PPE is being used correctly.
f) Maintaining the documentation that outlines the boundaries of classified or restricted areas and any specific measures to prevent the unintentional ignition of an explosive atmosphere.
g) Conducting routine safety checks or job observations to ensure the practices are being followed.
h) Ensure applicable JSA's are in place and communicated to all affected workers.
i) Ensure welders performing work on pressure vessels and piping follow the applicable Quality Control Manual approved by the provincial authority or regulator (e.g., Alberta Boilers Safety Association).

1.5.3 Workers and Welding Contractors

a) Comply with Harvest Welding & Cutting – Safety Considerations COP and CSA Standard *W117.2 - 06, Safety in Welding, Cutting and Allied Processes*.
b) Follow the procedures determined by the hazard assessment and approved by the Work Site Supervisor.
c) If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.
d) Contractors performing welding work on pressure vessels and piping must follow the applicable Quality Control Manual approved by the provincial authority or regulator (e.g., Alberta Boilers Safety Association).

1.6 Training Requirements

All Worksite Supervisors and Workers must be orientated in Harvest's Welding & Cutting – Safety Considerations COP and Safe Work Agreement System. They must be able to recognize potential hazards associated with cutting and welding operations (e.g., leaks, spills, changes in operation, fires, explosions, confined spaces, flying debris and arc flash, etc.).

Welders must be qualified and competent to perform each welding procedure. Each welder's qualification documents and tickets must be validated prior to commencement of any hot work. Welders must follow Harvest's Pressure Equipment Integrity Management Plan and the applicable Quality Control Manual approved by the provincial authority.

The Fire Watch must be competent and capable of performing this task and must understand their duties and responsibilities and be familiar with how to respond in rescue and emergency situations, including the operation of fire, rescue, and emergency equipment.

1.7 Site Specific Orientation & Hazard Assessment

Prior to any welding a site specific orientation & hazard assessment must be completed between all parties directly involved with or affected by the welding. This includes:

1. Reviewing and discussing all hazards, hazard controls, conditions, and restrictions documented with workers prior to starting the welding

   Hazards include but not limited to:

   - Fire and explosion
   - Toxic fumes
   - High temperature
   - Radiation
   - Flying debris
   - Welding flash
   - Sparks
   - Confined Space or Restricted Space
   - Electrical hazards
   - Adverse weather
   - Burns

   Note: All affected workers must be included in the site specific orientation & hazard assessment and in the control or elimination of those identified hazards. Further, all other workers at the work site or at other work sites that may be affected must be informed of the hazards and of the methods used to control or eliminate the hazards.

   The following are examples of gas and electric welding hazards and controls.

   - **Hot Metal and Sparks**

   The necessity for protective clothing against sparks and pieces of hot metal will depend on the position of the work activity relative to the welder's body. For example, a welder standing at a bench may only require leather gauntlet gloves and a welding head screen; but where the work activity is overhead, the welder will require complete protection of the head, arms, and upper body.

   - **Toxic Fumes**

   Toxic gases and fumes produced in welding operations can create serious hazards. Adequate ventilation or respiratory protection must be provided.

   - **Flying Objects**

   Grinding is always a hazardous operation with sparks and pieces of flying debris. Eye injuries are commonly caused by chipping slag from electric arc welding.

Appropriate eye protection, gloves, leather gauntlets, guards and vests are required.

- **Electric Arc**

The eyes and skin are susceptible to injury from radiation produced from arc welding. Looking at an arc from a distance and even for a few seconds can result in injury, which does not become apparent until 4 to 8 hours later.

- **Electrical Shock**

Electric shock can cause severe burns and in some cases may be fatal when there is contact with an energized welding circuit. Measures such as appropriate grounding and bonding must be in place. Refer to the Grounding & Bonding Safe Operating Procedures (SOP).

- **Action of the Heat Source on the Atmosphere**

An oxy-acetylene flame in contact with a large mass of cold metal for a long period may produce nitrous oxide fumes. These fumes are dangerous and possibly fatal if inhaled over a long period. A deficiency of fresh air during such work may result in carbon monoxide poisoning therefore adequate ventilation or respiratory protection must be provided.

- **Action of the Heat Source on Base Materials and Electrodes of Welding Rods**

Arc welding of iron or steel produces fumes containing very fine particles of iron oxide. The welding of brass, bronze and manganese steel requires adequate ventilation or the wearing of respiratory protection to provide effective nasal-oral protection.

- **Action of a Heat Source on Applied Coatings**

  a) Harmful fumes may be produced by the action of the arc or flame on certain paints and protective coatings on the metal being welded. The welding and cutting of coated materials should only be carried out when an adequate means for removing the fumes is provided or adequate respiratory protection is worn.
  b) Welding involving surfaces with lead-based paints creates harmful vapours as such the paint on the welded surface must be removed, and adequate ventilation or respiratory protection must be provided.
  c) Inhalation of fumes when cutting zinc galvanized metal may result in the development of metal fume fever. Symptoms of the condition are a high temperature, aching muscles, shivering and sweating. These conditions develop a few hours after exposure and disappear after approximately 24 hours. Adequate ventilation or respiratory protection must be provided.

d) The welding of greasy material can produce unpleasant fumes. Accordingly, such materials should be degreased before welding. Parts, which have been degreased, should be dry before welding because Trichloroethylene, a commonly used degreasing agent, decomposes on heating to form toxic gases (e.g., chlorine dioxide, phosgene). Adequate ventilation or respiratory protection must be provided and appropriate PPE must be used.
e) The combination of inert gas welding and higher electrical currents can form ozone in amounts that could be dangerous. This method of welding must only be carried out in well-ventilated areas together with suitable breathing apparatus.
f) In confined spaces, the introduction of an inert gas may lead to the reduction of oxygen to a dangerous level. Therefore, test continuously to determine the percentage of oxygen in the confined space. Refer to the Confined Space Entry COP.

- **Hardened Deposits**

Where hardened deposits are found on equipment or material, welding or cutting must not be started until the general nature of the deposits is established. Effective protective measures must be taken when dangerous fumes are released during cutting or welding.

- **Improper Handling of Compressed Gas Cylinders**

a) Compressed gas cylinders that have their valve stem break off can become rocket-like projectiles. Oxygen cylinders can explode if grease or oil is permitted to enter the cylinder or its regulator.
b) Acetylene cylinders contain acetone. If the cylinder is laid on its side, the acetone will react with the acetylene gas resulting in over-pressurization, thereby causing the cylinder to explode.
c) All oxygen and acetylene bottles must have anti-flashback valves located between the hoses and the regulator.

Note: Refer to Fire Safety and Prevention SOP.

- **Electromagnetic Forces**

Electromagnetic fields and high frequency voltages generated by various types of welding equipment may cause interference with electro-medical devices such as cardiac pacemakers.

2. Discussion of the job and necessary work practices, and JSA's that need to be implemented to conduct work. If JSA's do not exist, they may need to be developed prior to commencement of work
3. Impact on and from adjacent operations
4. Fire and explosion prevention controls and equipment requirements
5. Rescue and emergency response procedures, roles and responsibilities

1.8 Hazard Controls

The hazard controls must be applied in accordance with the hierarchy of controls. Refer to the table below:

Harvest Hierarchy of Hazard Controls (if hazard elimination is not possible)		
1st Choice	Engineering Controls	• Substitution • Isolation • Ventilation
2nd Choice	Administrative Controls	• Policies and Standards • Safe Work Practices • Training
3rd Choice	Personal Protective Equipment (PPE)	• Eye Protection • Respirators • Face Protection
4th Choice	Combination of Above May be Required	• Engineering • Administrative • Personal Protective Equipment

The Safe Work Agreement Issuer and Receiver will agree on what hazard controls are required and who will be responsible to ensure those controls are implemented. This is to be documented on the Site Specific Orientation & Hazard Assessment.

1.9 PPE Requirements

General welding PPE requirements include but not limited to:

a) All welders, cutters, helpers, and attendants must wear approved PPE during welding operations.
b) Wear breathing apparatus (not canister respirator) when using an oxy-acetylene flame on sheet metal coated with metallic lead, zinc, lead paints, or other toxic substances.
c) In confined spaces where there is inadequate ventilation, wear an airline breathing apparatus.
d) Wear a breathing apparatus when metal spraying.
e) A screen, curtain, or partition used to protect workers from arc flash during welding operations must be made of or be treated with a flame-resistant material or coating, and must have a non-reflective surface finish.
f) Wear welding screens, goggles, or spectacles when looking at a welding arc.

g) Depending on the duration or type of welding, eye wash or water for cleaning purposes may be required
h) Shop welding areas must be curtained off and ventilated to keep fumes away from other workers.

Additional PPE that may be required during welding and cutting operations includes, but not limited to:

- Hearing protection
- Leather gauntlet gloves and apron
- Fire-resistant boots or leggings
- Capes or shoulder covers
- Gas detection device

1.10 Safe Work Agreement

In most situations, a Safe Work Agreement for Hot Work will be issued for the primary task such as construction, repairs, or maintenance that requires welding services.

The Worksite Supervisor may designate a safe area for hot work such as welding and cutting without gas testing and issuing a Hot Work Safe Work Agreement if all of the following conditions are met:

1. The safe area is 25m from any source of hydrocarbons and complies with Alberta's OHS Code: Part 10 - Fire and Explosion Hazards.
2. The safe area is 25m from any hazardous location (see Code for Electrical Installations at Oil and Gas Facilities).
3. There is no potential for a hazardous atmosphere to exist for even a limited time.
4. The welding or cutting will not release a hazardous substance.
5. The safe area must comply with the relevant Provincial Regulatory agency:

Note: In forested areas, must comply with the provincial forestry regulations and fire bans.

6. The safe area complies with Harvest's Fire & Explosion Hazard Management COP.

1.11 Safety Requirements for Welding and Cutting

When welding and cutting, personnel must meet the following requirements:

a) Welding services must comply with latest edition of CSA Standard W117.2-01 Safety in Welding, Cutting and Allied Processes.
b) Welding equipment, including regulators, automatic reducing valves and hoses, must be used only for the gas for which they were designed.

c) Before using gas welding or burning equipment, the operator must ensure that the equipment is free from defects, leaks, oil and grease.

d) Good housekeeping must be maintained so that welding machines, cables, and other equipment does not create slip, trip or fall hazards.

e) Warning signs shall be posted in conspicuous locations to indicate welding hazards, required PPE, entry restrictions. Barricades may also be required.

f) For confined spaces or excavations, follow Harvest's Confined Space Entry and Ground Disturbance COP and other relevant SOP's (e.g., Lockout – Tagout (Zero Energy))

g) Ensure applicable fire extinguishing equipment is ready for immediate use where welding is conducted. Refer to the Portable Fire Extinguisher SOP.

h) Use a Fire Watch on each welding and cutting operation where:

- Other than a minor fire might be caused,
- Combustible materials are within 15m (50ft) of the welding operation, or
- A hazardous location is within 25m (82ft) of the welding operation.
- Work is being conducted under a hot work Safe Work Agreement

i) Welding must not be done on any vessel, tank, pipe or structure, or in any place where the presence of a flammable or explosive substance is likely to exist until tests have been made by a qualified person to ensure the work may be safely performed

j) If welding or allied process is performed above an area where a worker may be present, the worker below must be protected from sparks, debris, and other falling hazards.

k) Whenever hot metal is present (e.g. during or after welding), it must be marked "hot".

l) Do not hang hoses or pile them close to the cylinders when in use. This could hinder closing cylinder valves in case of fire.

m) Do not cut or weld on steel drums that once contained volatile liquids, gases, or reactive substances (e.g. pesticides or herbicides).

n) Do not weld or cut any metal that has been cleaned with a flammable or combustible liquid until the metal has thoroughly dried.

o) Ensure piping is isolated from service and pressure relieved prior to welding or cutting, except with hot tap approval. Refer to the Energy Isolation SOP's.

p) Cutting on pressurized lines is an unacceptable practice, "cold cutting" included

q) When cutting or welding on a line, no one should be in front of or near the opened end.

r) Where sparks from welding or grinding can fall on flammable materials which are not practical to remove, a fire blanket must be used and continuous monitoring must take place to ensure no flammable vapours are present

s) Welding is not permitted on the personal possessions (e.g. vehicles, wheels, tools etc.) of employees on Harvest worksites and facilities.

1.11.1 Live Electrical Welding Circuits

Safe work procedures to prevent electric shock include but are not limited to the following:

a) The welder must not allow live metal parts to touch their bare skin Welders who are required to weld in damp conditions must ensure that their welding gloves and clothing are kept dry throughout the welding operation.
b) Rubber-soled work boots must be worn and dry non-conductive materials shall be used to prevent direct or indirect contact with damp earth or work surfaces. Voltage-reducing devices shall be used to reduce the risk of electric shock
c) Welding cables must not be run through wet areas.
d) Use caution when changing electrodes as contact with a live electrode can be fatal. Most electric shocks occur when changing electrodes.
e) When required to stand or lie on metal to perform welding, protective insulation shall be used to protect the welder's body from direct contact with the metal.
f) Welding cables with damaged electrical connections, conductors or insulation must be removed from service
g) Refer to CSA Standard W117.2-01 (R2006), Safety in Welding, Cutting and Allied Processes for additional information on electrical hazards and the correct procedures for grounding of welding machines which must comply with Part 1 of the Canadian Electrical Code or the provincial regulatory authority.

1.11.2 Fall Protection and Rigging

If a welder and/or their helper can fall either a distance of 3m or into/onto a hazardous object or substance that is less than 3m, a fall protection system must be used. Refer to the Working at Heights SOP.

1.11.3 Ventilation

Proper ventilation should be maintained to carry fumes, smoke, and airborne particles away from the welder. Ventilation can be either natural or mechanically induced.

Where ventilation cannot be achieved, the welder must wear respiratory protective equipment. Refer to the Respiratory Protection COP.

1.11.4 Adverse Weather Conditions

A hazard assessment must be conducted to determine if weather conditions are suitable for outdoor welding. Welding operations shall be suspended if, weather conditions are not suitable or when air temperatures are below those specified by the appropriate codes or contract.

1.12 Gas Welding and Cutting Operations

For gas welding and cutting operations, personnel must meet the following safety precautions:

a) The welder should never permit the hoses to become kinked or material to be piled on top of hoses. Hoses, when crossing walkways or roadways, must be protected on either side by planking.
b) Each time the hose or regulator is reconnected to the cylinder the connection must be tested immediately with soapy water or some other method to ensure that there is no leak of the gas supply.
c) Connections which do not fit properly must not be forced on.
d) Valves and regulators must be kept in good condition and checked regularly according to the manufacturers recommendations.
e) Hoses should be visually examined prior to each use and tested according to the manufacturers recommendations.
f) Oil or grease must never be used on valves or fittings of oxygen cylinders.
g) All oxygen and acetylene bottles must have anti-flashback valves located between the hoses and the regulator.
h) Friction lighters must be used to light torches. Matches must never be used. Do not re-light torches from hot metal.
i) Cylinders should be kept upright and properly supported and secured at all times.
j) Acetylene cylinders must not be used at over 15 psi (94 kPa) gauge pressure.
k) Copper connections and fittings must not be used on acetylene tanks and equipment.
l) Oxygen must never be used to replace compressed air or released into a confined space.
m) Caps must be replaced on cylinders as soon as the regulator has been removed. The proper caps must be replaced on cylinders whenever the cylinder is to be moved.
n) Valves on cylinders must be closed and the hose pressure released when work is stopped or completed.
o) Oxygen or acetylene must never be used from a cylinder without a reducing valve being installed.
p) Hoses must be kept off stairways where they may become tripping hazards. They should also be kept off platforms and walkways as much as possible.
q) Before connecting the regulator, “crack” the cylinder valves and immediately close them again. Stand to one side while doing this. This will clear the valve and connection of dust or dirt.
r) Always light the torch using acetylene before turning on the oxygen.
s) Do not hang torches from the regulators attached to the cylinders.
t) Torches must never be left unattended in a vessel. They must be removed before leaving the vessel. If the welder leaves the job, the valves on the cylinder must be closed.
u) Acetylene cylinders should only be open 1½ turns.
v) Oxygen cylinders should be fully opened (valve must be back seated).

1.13 Electric Arc Welding

a) All equipment must be examined prior to use and tested according to the manufacturers' recommendations.
b) Equipment grounding must not be made to handrails, stairs, and lighting poles or to production lines in service; unless the object is being worked on and is properly bonded to the ground. The grounding connection should be made as close to the work as possible.
c) Clothing, gloves, and boots should be kept dry and in good condition.
d) During electric welding operations, fire-retardant screens must be used to protect all persons in the vicinity of the work.
e) Always spread out the coiled welding cable before use to prevent overheating.
f) All cables must be protected from pedestrian and vehicle traffic.
g) Welding cable must not have connections within 3m (10ft) of the stinger.
h) Welding cables which have damaged insulation or bare conductors must be removed from service.
i) The electric welding machine must not be left unattended without removing the electrode.
j) Ensure that appropriate welding and grounding leads are used to fasten the electric supply cable securely.
k) When arc welding is suspended for any substantial period of time, such as during lunch or overnight, remove all electrodes from the holders and locate the holders so that accidental contact cannot occur. Disconnect the machine from the power source.
l) An appropriate container (e.g. metal pail) must be used for collection and disposal of electrode stubs

1.14 Welding Trucks

a) Welding services provided from vehicles must comply with CSA Standard W117.2-01 (R2006), Safety in Welding, Cutting and Allied Processes. The vehicle storage compartments, and the handling, storage and transport of compressed gas cylinders must comply with provincial OH&S Codes and Regulations.
b) Mobile welding trucks must be equipped with a 30lb dry chemical fire extinguisher before entering the work site.
c) Vehicle operators must know how and when to use such fire extinguishers.
d) On gas welding equipment, suitable flashback devices are to be installed on both hoses to prevent reverse gas flows.
e) Storage compartments must be solid walled with vents to ensure that gases do not accumulate and reach their lower explosive limit (LEL). The compartments must be constructed so that gases or vapours cannot flow into adjoining compartments. The latching and locking hardware must be made of non-sparking materials.

f) The transport of cylinders must comply with TDG Regulations.
g) Vehicle operators must have all SDS's available and corresponding labels displayed to comply with the regulations.

1.15 Use of Compressed Gas and Cylinders

When using cylinders, adhere to the following requirements:

a) Never mix gases in a cylinder.
b) Make sure the threads on regulators correspond to those on the cylinder valve outlet.
c) Never force connections that do not fit. Different threads and thread sizes are used on cylinders to prevent interchange of equipment.
d) Open cylinder valves slowly to avoid pressure surges.
e) When "cracking the valve" (i.e., opening the valve for an instant to clear the opening of dust or dirt), take the following precautions:

- Never crack a valve near a flame or other source of ignition.
- Always point the valve opening away from your body but not toward anyone else.
- Compressed gas cylinders containing highly toxic gas should not be opened or vented into the atmosphere.

f) Always use compressed gas cylinders with a pressure-reducing regulator.
g) Before removing a regulator from the cylinder, close the cylinder valve and release all gas from the regulator.
h) Never attempt to stop a leak between a cylinder and a regulator by tightening the adjusting nut, unless the cylinder valve has been closed.
i) Do not allow sparks, molten metal, electric current, excessive heat or flames to come in contact with the cylinder, the hose, or regulator.
j) Never use cylinders for any purpose other than as containers for the particular gases for which they were designed.
k) Never use oil or grease as a lubricant on valves or attachments to oxygen cylinders, since oil and oxygen under pressure can be a fire and explosion hazard. Also, oxygen regulators must not be handled with oily or greasy hands or gloves.
l) Never use fittings or equipment containing copper (except burner tip) with acetylene, as copper in contact with acetylene is liable to form the dangerously explosive compound copper acetylide.
m) When valve protection hoods become frozen or filled with ice, let them thaw out in a warm room. Never use steam to thaw them out.
n) Never use compressed gas to dust off clothing.
o) Close cylinder valves tightly when not in use or empty.
p) Never use a flame to detect gas leaks. Use soapy water.
q) Remove cylinders with leaking valves to a safe location. Ensure they are depressurized and tagged as having a defective valve.

r) Never use compressed oxygen as a substitute for air. Ensure that compressed oxygen is always designated by its proper name.
s) Never attempt repairs to valves or gauges; return them to the supplier.

1.16 Cylinder Handling and Transporting

When handling or transporting full or empty cylinders, adhere to the following operating requirements:

a) When moving or lifting cylinders:
- Use a cart, carrier, or get help.
- Roll them on their bottom end. Do not drag them.
- Do not drop or strike cylinders or allow them to strike each other violently.
- Do not hold or grip the valve or valve protection cap.

b) Cylinders moved by a crane or hoist must be secured in a cradle or cage. The use of slings or ropes is prohibited.
c) Cylinders that are to be transported must be loaded and secured in an upright position unless approved and certified by a professional engineer.
d) Cylinders must never be used as rollers, jacks, or work supports, and/or used for any purpose other than to contain gas.
e) Cylinder valves must be kept closed with the valve protection cap in place during handling or transport.

1.17 Cylinder Identification

a) All compressed gas cylinders must be clearly marked and labelled (chemical and/or trade name) to properly identify their contents.
b) TDG and WHMIS information must be attached to the cylinders.
c) Empty cylinders must be legibly marked as “empty” using a wired tag or stick-on label.
d) Do not write on the sides of cylinders with chalk or markers.

1.18 Storing Cylinders

When storing compressed gas cylinders, adhere to the following requirements:

a) After using compressed gas cylinders or as soon as the work is completed, return the cylinders promptly to their designated storage area.
b) Secure all cylinders in an upright position with the valve closed and ensure the valve protection cap is in place.
c) If cylinders are stored in cabinets, mark the cabinets to identify their contents along with the placement of WHMIS labels.
d) Secure cylinders with a chain, cable, strap or wire so they will not fall. Do not use rope.
e) Do not secure cylinders to process lines or an electrical conduit.

f) Isolate and store empty cylinders separately from full cylinders.
g) Segregate cylinders by their contents.
h) Do not store oxygen cylinders within 7.5m (25ft) of combustible gas cylinders or near any other substance (oil or volatile liquids) where an accelerated fire could result, unless protected by an approved fire-resistant wall.
i) Do not store fuel gas (e.g., propane) cylinders in any building.
j) If cylinders are stored outside, protect them from corrosion and direct sunlight.
k) Ensure SDS labels are placed on all cylinders and SDS's are current and readily available to workers.

1.19 Cylinder Storage Areas

Designated storage areas as per provincial regulations must be:

a) Well ventilated under all weather conditions to permit passive airflow,
b) Situated such that gases or vapours in the storage compartment cannot flow into and accumulate in adjoining storage compartments or buildings,
c) Situated away from general traffic paths, roads, and production facilities,
d) Dry, unheated, and free of oil and grease,
e) Identified with signs stating:

Compressed Gas Cylinder Storage
No Smoking, Matches, or Open Flames

f) Secured with non-sparking latching and locking hardware
g) Equipped with explosion-proof lighting and alarm systems

HYDROGEN SULPHIDE

10.0 HYDROGEN SULPHIDE

10.1 Policy

All Harvest Operations Corp (Harvest) operations processing hydrocarbons with any concentration of H_2S must be evaluated for the potential of worker overexposure. If the potential of overexposure to H_2S exists, then this Code of Practice (COP) must be implemented.

The Manager of EH&S has the overall responsibility to ensure this COP is reviewed on an annual basis and kept current with regulations. Individual specific responsibilities for the COP implementation is covered in section 12 of this document.

10.2 Purpose

The purpose of this COP is to ensure all reasonable precautions are in place to eliminate possible worker overexposure to H_2S. In addition, the COP will identify properties / hazards associated with H_2S, exposure limits, possible sources of H_2S, detection and monitoring requirements, required personal protective equipment, signage and product labeling requirements, worker training requirements, use of safe work procedures, emergency procedures in the event of exposure to H_2S, and individual responsibilities.

10.3 Definition and Hazards

Hydrogen Sulphide is the chemical compound with the formula H_2S. It is a colorless, highly toxic, and flammable gas commonly found in oil and gas deposits. H_2S dissolves in water and oil, and it may be released when these liquids are heated, depressurized, or agitated.

10.3.1 Properties

- Color: colorless.
- Odor: very offensive, similar to rotten eggs in small quantities.
- Vapor Density: 1.189 (air 1.0), H_2S is heavier than air thus low lying areas may have higher concentrations of H_2S.
- Boiling Point: minus 60 Degrees C.
- Explosive Limit: 4.3 to 46 percent by volume in air.
- Auto Ignition Temp: 260 Degrees C.
- Water Soluble: Yes – 4 volumes of gas in 1 volume of water at 0 Degrees C.
- Flammability: Is flammable in air at 40,000 ppm (4%) or higher.

10.3.2 Health Hazards

H_2S is extremely toxic at very low concentrations. More than 100 ppm is Immediately Dangerous to Life and Health (IDLH) for exposure of 30 minutes or more. Exposure to more than 10 ppm for eight hours (OEL), or more than 15 ppm for 15 minutes, may irritate the eyes, nose and throat.

Table 1 Summarizes the effects that result from inhaling various concentrations of H_2S.

PPM	%	Comments
1	0.0001	Can be smelled.
10	0001	Cannot exceed at anytime without respiratory protection. Eyes, nose, throat and lung (respiratory tract) irritation.
10 – 50	0.001 – 0.005	Marked eye, nose, throat and lung irritation.
50 – 100	0.005 – 0.01	Most individuals may lose sense of smell. Severe eye, nose, throat and lung irritation. *100 ppm is Immediately Dangerous to Life and Health (IDLH).*
100 – 500	0.01 – 0.05	"Knockdown" may occur. Loss of consciousness, poor balance and confusion. Lungs may fill with fluids (pulmonary edema).
500 – 1000	0.05 – 0.1	Breathing may stop. Permanent brain damage or death may occur if not rescued and resuscitated immediately.

10.4 Exposure Limits

Occupational Exposure Limits (OELs) for H_2S are set by provincial occupational health and safety agencies.

Table 2 below summarizes the occupational exposure limits for H_2S:

Province	8 Hour OEL (ppm)	15 STEL (ppm)	Ceiling (ppm)
Alberta	10	-	15
British Columbia	-	-	10
Saskatchewan	10	15	-

- **8 Hour OEL** – is the average exposure based on an eight hour exposure period.
- **15 STEL – Short Term Exposure Limit. The average exposure based on a 15 min exposure** period. No more than four STEL are permitted during an 8 hour shift.
- **Ceiling** – The maximum concentration to which worker can be exposed to even instantaneously.

BC Note: In British Columbia, the OEL for H_2S is a Ceiling Limit (not to be exceeded) of 10 ppm. At levels above this ceiling, only workers who are trained in the hazards of H_2S and are wearing required protective equipment may enter the work area.

10.5 Hydrogen Sulphide Sources

The following table is to be used as a guide to Harvest personnel and contractors when considering possible sources of H_2S when performing certain tasks. It is not a comprehensive list and therefore a risk/hazard assessment of the work operation must be performed taking in account the following:

- H_2S content of the process stream,
- Previous exposure monitoring results,
- Operation factors ie. Purging, degassing, temp/pressure of process stream, and ventilation.
- Restricted access or remoteness of location

The need for a Backup person must always be considered whenever SCBA/SABA is donned

***Site Specific Orientation & Hazard Assessment (Documented) determines if SCBA/SABA or backup is required.**

Task	H_2S Monitors Required	SCBA/SABA Required	Backup Person Required
Well maintenance (pump jack servicing, no breach of piping integrity)	Yes	*Hazard ID	*Hazard Assessment
Pigging	Yes	Yes	*Hazard ID
Breaking equipment integrity when >10 ppm H_2S in air	Yes	Yes	Yes
Maintenance on equipment without breaking integrity	Yes	*Hazard ID	*Hazard ID
Process Filter changes	Yes	Yes	Yes
Entering compressor basements	Yes	Yes	Yes
Responding to H_2S alarms	Yes	Yes	Yes
Sampling with open containers	Yes	Yes	*Hazard ID
Sampling with closed containers	Yes	*Hazard ID	*Hazard ID
Gauging tanks	Yes	Yes	*Hazard ID
Maintenance on purged equipment	Yes	*Hazard ID	*Hazard ID
Entering dikes / fire walls	Yes	*Hazard ID	*Hazard ID
Routine Operations	Yes	*Hazard ID	*Hazard ID
General trucking sour fluids when making and breaking connections	Yes	Yes	*Hazard ID
Uncoupling vent lines	Yes	Yes	*Hazard ID
Uncoupling load lines	Yes	Yes	*Hazard ID
Checking tank compartments during the transfer of sour fluids	Yes	Yes	*Hazard ID
Responding to release or emergency in unknown atmosphere	Yes	Yes	Yes

Caution: H_2S is soluble in water and hydrocarbons. Any H_2S gas that comes out of solution will collect in the head spaces of tanks, pipes and vessels containing sour liquids. It is possible for H_2S to collect in confined areas in concentrations far exceeding those found in the liquid. For example, the head space of a tank may exceed the Occupational Exposure Limit even though it may contain oil with as little as 0.5 ppm H_2S.

10.6 Detection and Monitoring

H_2S detection and monitoring must be conducted using suitable chemical sensing instruments. Suitable chemical sensing instruments include personal monitors and fixed monitoring equipment.

Personal monitors must be carried by all workers and must provide continuous readings and sound an alarm if H_2S levels exceed 10 ppm.

Fixed monitors that are permanently mounted at facilities or wells must continuously monitor H_2S concentrations and sound an alarm at 10 ppm H_2S.

Personal monitors and fixed monitors must be operated in accordance with the manufacturer's operating specifications. This includes regular calibration and daily bump testing.

Prior to entering buildings there must be a site-specific JSA in place to ensure the atmosphere inside the building is safe for entry. Refer to the Light Hydrocarbons Safe Operating Procedures (SOP).

BC Note: In BC, workers testing must be done for Hydrogen Sulphide before entry to any diked area where sour fluid is stored.

Caution: All chemical sensors have a response time from when the monitor is placed in an H_2S atmosphere to when the sensor reaches the actual reading. Operations of sensors at temperatures below -20 Degrees C may cause lengthened response times.

Caution: Pure Hydrogen Sulphide is slightly heavier than air but when mixed with other hydrocarbons such as Methane, the mixture can be lighter than air. When mixed with heavier hydrocarbons, such as NGL, the mixture is much heavier than air. It is almost impossible to predict where H_2S may concentrate in outdoor areas or buildings and is why it is critical to monitor for H_2S in all locations.

10.7 Personal Protective Equipment

Respiratory protection is required and backup maybe required (determined through Site Specific Orientation & Hazard Assessment) when:

- H_2S concentrations are above occupational exposure limits,
- There is any indication of equipment failure or product leak; or
- Entering a confined space or a restricted space as per the Harvest's Confined Space COP.

The respiratory protection must be:

- A full face positive pressure self contained breathing apparatus (SCBA), or
- A full face positive pressure supplied breathing apparatus (SABA) equipped with a 5 minute escape air bottle.

For additional information refer to the Respiratory Protection COP.

Other mandatory PPE includes fire retardant outerwear, safety glasses, hard hat and steel toed boots, etc.

10.8 Identification of H_2S Areas – Signage and Product Labels

10.8.1 Signage / Security

At each Harvest worksite, all sources and concentrations must be identified. All areas where H_2S concentrations may exceed 10 ppm must have a sign posted at the lease entrance indicating the presence of poisonous gas (AER Reg Sec. 7.070). The sign must also state the legal description of the surface location, company name, and 24 hour emergency phone number. The lease must be fenced in accordance with applicable AER regulations.

10.8.2 Product Labels

Appropriate WHMIS labeling is required for all products (sour natural gas, sour condensate, sour crude oil, sour produced water) located at the site either being temporarily stored (e.g.,. tanks) or as a process stream (e.g., piping).

Refer to WHMIS requirements for additional information.

10.8.3 SDS

SDS must be readily available for all products (sour natural gas, sour condensate, sour crude oil, sour produced water) and used in the site specific orientation hazard assessment / job planning preparation.

10.9 Training

All workers prior to entering an area where H_2S is present or may be encountered must:

- Complete the Enform - Electronic General Safety Orientation (eGSO)
- Be orientated to this H_2S COP.
- Hold a current H_2S Alive certificate.
- Ensure a proper mask fit test has been performed.

Additional worker training may be required. Refer to the Harvest EHSMS – Orientation and Training for a complete list of training requirements.

10.10 Safe Work Procedures

Prior to conducting any work, Harvest's Work Agreement System must be followed. In addition, all work tasks must go through Harvest's Hazard Identification, Risk Assessment and Control process. Hazards, risks and controls must be communicated with all workers. Site specific safe work procedures that have been developed through the Job Safety Analysis (JSA) process are to be used for all critical tasks.

Specific to this COP, prior to entering H_2S areas all of the following must be satisfied:

- The atmosphere in and around all buildings and equipment located on worksite must be controlled within the occupational exposure limits. If limits are exceeded workers must immediately exit the area and initiate communication with another area worker. As per Harvest policy – If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.
- Workers must carry personal monitors that provide continuous readings and sound an alarm if H_2S levels exceed 10 ppm.
- Continuous monitoring equipment is present in all buildings to be entered, OR it has been checked according to a site-specific Building Entry JSA.
- Workers have a communication plan and safe work procedures in place.

Note: Harvest site-specific JSA's must be followed for all critical tasks.

10.11 Emergency Response

There are seven steps to take during an H_2S emergency.

1. **Evacuate:** Get away from the hazard – direct others to safe area.
2. **Alarm:** Alert others to the danger and situation.
3. **Call for Help:** Notify your supervisor. If your supervisor cannot be contacted, call 1-800-760-2826.
4. **Assess:** Assess hazards - don't just rush in and endanger yourself. Account for **all** personnel.
5. **Rescue victims:** Protect yourself and others - use appropriate procedures and protective equipment. Remove victims to a safe location. Revive victims. Administer first aid. Ensure medical aid or transport has been dispatched.
6. **Secure the area:** Prevent unauthorized access. Take steps to protect the environment, property and equipment.
7. **Act as the On-site Supervisor until relieved by appropriate Harvest Supervisor.**
8.

In addition, refer to Harvest's Corporate ERP or Site-specific ERPs for more information on Harvest's ERP policies and procedures.

Note: All workers that have been overexposed to H_2S require medical attention. Even if they revive quickly, there is still a possibility that the lungs may collect fluid some hours after exposure.

10.12 Responsibilities

In addition to the EH&S Responsibilities as outlined the EHSMS the following responsibilities are specific to working around H_2S:

10.12.1 Superintendent and Manager

- Regularly review compliance to the H_2S COP.
- Ensure that H_2S training needs (ie. H_2S Alive, Respiratory protection) are identified and workers are competent to perform their tasks.
- Ensure that emergency response plans are current and that exercises are conducted as required.
- Ensure that Worksite Supervisors receive the orientation to the H_2S COP.

10.12.2 Foremen and Supervisors

- Ensure that appropriate H_2S COP orientations are conducted and recorded for all new or transferred workers.
- Ensure appropriate safety equipment specific to H_2S exposure / detection / monitoring including PPE is readily available, used and well maintained.
- Review the H_2S COP with all workers and enforce compliance.
- Inform workers of their responsibility to identify unsafe H_2S conditions or activities and to refuse unsafe work.
- Ensure identified H_2S training requirements are met for all workers.
- Ensure that H_2S hazards are identified and controlled before work proceeds.
- Implement detection and control of H_2S and other hazardous gases to
- Prevent harmful exposure to workers or the public.
- Direct work to be stopped when an unsafe act or condition is identified. Resume work only after the H_2S hazard is removed or safe procedures have been established.
- Ensure workers are informed of the worksite hazards and participate in hazard assessment and control identification.
- Ensure that SDS's are available for H_2S products brought on-site or produced and that workers are aware of them.
- Ensure workplace labels are attached to all hazardous material containers as per WHMIS regulations.
- Ensure that effective emergency response exercises related to H_2S overexposure are conducted.

10.12.3 Worksite Supervisor

- Check that all employers on the worksite have an effective safety program and safe work procedures for H_2S.
- Check that all employers understand and agree to follow all requirements of Harvest's H_2S COP that are not already met by their own safety program.
- Review the site specific orientation & hazard assessment for all employers and visitors on arrival at the worksite
- Ensure the H_2S COP is reviewed and understood.
- Check that all employers on site are providing their employees with the appropriate H_2S training and supervision.
- Identify H_2S hazards related to the specific worksite, the planned program or the materials provided by Harvest. Inform all employers' supervisors of these hazards and ensure proper controls are in place before the work begins.
- Establish and co-ordinate site specific emergency response procedures. Post information, review procedures and conduct practice drills with all personnel on site (complete the Harvest site specific ERP template form).
- Monitor the work performed by all employers to verify compliance with the H_2S COP.
- Implement detection and control of H_2S and other hazardous gases to prevent harmful exposure of workers or the public.
- Direct work to be stopped when an unsafe act or condition is identified. Resume work only after the H_2S hazard is removed or safe procedures have been established.

10.12.4 Contractors and Subcontractors

- Ensure that their employees have received the H_2S COP orientation before working for HOC.
- Inform their workers of the responsibility to identify and to refuse unsafe work and ensure work is safe to perform before activity is resumed.
- Ensure employees are competent to perform their job safely and efficiently in an H_2S environment.
- Ensure only properly trained workers operate equipment or machinery.
- Ensure proper PPE is available, utilized by all personnel and maintained as per manufacturer's specifications.
- Conduct frequent inspections of the work site to ensure workers are following the H_2S COP.
- Ensure workers identify H_2S hazards and inform Supervision of the hazards and help with developing controls to eliminate or reduce the risk.

- Ensure all hazardous materials brought on site are identified; applicable SDS's are available and reviewed with workers.
- Ensure that site specific emergency response plans are in place, that workers are familiar with and understand them, and participate in drills as requested.

10.12.5 Workers'

- Attend and actively participate in the site specific orientation & hazard assessment, tailgate and general safety meetings.
- Follow environment, health and safety standards and safe work procedures and or JSA's set out by the employer for working around H_2S.
- Review site specific emergency response plans and participate in drills as requested.
- Know the location, type and operation of emergency equipment.
- Refuse to perform work when unsafe conditions exist.
- Refuse to perform work when they are not competent to perform the task.
- Immediately report potential H_2S hazards to supervisors.
- Use required personal protective and safety equipment for reducing H_2S exposure.
- Check tools and equipment, including personal protective and safety equipment for hazards before using them.

10.13 Definition

Area - Refers to a specific portion of a process, facility, field or worksite.

Backup Person - A competent person, trained to provide backup (with SCBA or SABA on and mask at the ready) for workers involved in a specific task. They must be knowledgeable of all hazards involved and the steps to take in an emergency.

Confined Space - "confined space" means a restricted space which may become hazardous to a worker entering it because of an atmosphere that is or may be injurious by reason of oxygen deficiency or enrichment, flammability, explosivity, or toxicity, a condition or changing set of circumstances within the space that presents a potential for injury or illness, or the potential or inherent characteristics of an activity which can produce adverse or harmful consequences within the space;

Fixed Monitoring - An electronic sensing system permanently installed in a facility, which continuously monitors for H_2S and issues both visual and audible alarms if concentration exceeds 10 ppm.

H_2S (Hydrogen Sulphide Gas) - A colorless gas which may have the smell of rotten eggs in very low concentrations. Very toxic in small quantities and also very explosive with a wide flammability range.

IDLH - “immediately dangerous to life or health” means circumstances in which the atmosphere is deficient in oxygen or the concentration of a harmful substance in the atmosphere:

- is an immediate threat to life
- may affect health irreversibly
- may have future adverse effects on health
- may interfere with a worker’s ability to escape from a dangerous atmosphere;

PPM (Parts Per Million) - Means of measuring very small volumes (e.g. 1% = 10,000 PPM).

Personal monitor - An electronic device worn by the worker that continuously samples the atmosphere and issues an audible warning when the H_2S level reaches 10 ppm.

Respiratory Protection COP - A Harvest Operations Corp code of practice to ensure that respiratory hazards have been identified and the correct type of respirator is purchased, used, maintained and a proper mask fit is employed to achieve full protection of workers health.

Restricted space - means an enclosed or partially enclosed space, not designed or intended for continuous human occupancy, that has a restricted, limited or impeded means of entry or exit because of its construction;

SABA - Positive pressure, supplied air breathing apparatus using lengths of hose to supply air from a large bottle or set of bottles. The wearer must employ an egress (escape) bottle with this apparatus.

SCBA - Positive pressure, self-contained breathing apparatus. One of many different types employing a supply of air from a back mounted air bottle.

Worker - Any person performing work on the site. May be a company employee, a contractor or sub-contractor.

10.14 References

Alberta Occupational Health and Safety Code, 2009
British Columbia Occupational Health and Safety Regulation, 2006
CAPP Occupational Health and Safety of Hydrogen Sulphide (H_2S), March 2003
Saskatchewan Occupational Health and Safety Regulations, 1996

NORM (NATURALLY OCCURRING RADIOACTIVE MATERIAL)

11.0 NORM (NATURALLY OCCURRING RADIOACTIVE MATERIAL)

11.1 Introduction

NORM (Naturally Occurring Radioactive Material) is a natural source of radioactivity found in the earth's crust. The concentration of NORM in its natural state is very low and in general does not pose any health hazards.

However, higher concentrations may rise significantly as a result of human intervention and industrial activities which is then termed Technically Enhanced Naturally Occurring Radioactive Materials or TENORM.

11.2 Purpose

The purpose of this guideline is to ensure that all employees, contractors, and subcontractors engaged in any work where NORM contamination is present or may occur, are fully knowledgeable of the correct procedures to be followed to achieve maximum protection to human health and the environment.

11.3 Responsibilities

The Superintendant, Field Foreman or Worksite Supervisor will ensure that:

a) the workers are aware of the contents in this NORM COP
b) the required training occurs,
c) the work site is monitored for the presence of NORM,
d) the NORM contaminated waste is properly stored and disposed of,
e) the appropriate record keeping is done,
f) the necessary site specific task procedures are developed and implemented,
g) regular NORM testing occurs every three years, or whenever a process change has occurred, and
h) NORM testing and monitoring is conducted by personnel who are adequately trained in the:
   - hazards of NORM, and,
   - function testing and use of NORM monitoring equipment.

11.4 Task Identification

There are examples of procedures for controlling NORM exposure in Table “1”. Every site is different and Table “1” is a guideline to help site personnel understand the scope of the procedures required for the tasks. The Worksite Supervisor may need to develop further site specific procedures for their areas. The EH&S Advisor along with a 3rd Party Specialist e.g. NORMCAN, ALARA should be consulted when developing site specific procedures.

11.5 Training

All employees, prior to working on NORM contaminated equipment shall receive orientation on the:

a) type of radiation hazards presented by NORM materials/contamination and the necessary controls;
b) possible locations of NORM materials/contamination in the facility;
c) NORM monitoring procedures required before equipment in NORM contaminated sites can be opened for inspection, repair or maintenance;
d) Safe work procedures and PPE requirements for work on NORM contaminated equipment.
e) Containment, handling and labelling requirements.
f) Required documentation.

Note: Only trained, competent personnel may monitor for the presence of NORM contamination.

11.6 Offsite Work on NORM Contaminated Materials

All contractors and subcontractors receiving, repairing, or maintaining NORM contaminated equipment offsite shall be informed, in writing, of the potential for NORM contamination, the hazards of NORM and recommended controls measures for reducing exposures to NORM before the item is shipped to the contractor.

Exterior NORM contaminated equipment (e.g., downhole pumps) and all open ports of NORM contaminated equipment (e.g., valves) leaving the site shall be securely sealed with heavy plastic wrap (16 mil minimum) and duct tape, marked or labelled as NORM contaminated.

11.7 NORM Contaminated Waste Storage and Disposal

NORM contaminated waste (e.g., sludge, scales, liquids, PPE or contaminated equipment) cannot be disposed of until a formal review has been conducted by a qualified person or party.

Until the review is completed, the waste must be stored in a secure location, appropriately documented and the waste materials/containers appropriately labelled. See Appendix “A”, Storage Site Design and Containment.

Records shall be maintained to document at least the following information:

a) The storage location;
b) The type of material (scale, sludge, PPE, etc.);
c) The date the material entered storage;
d) The original location of material or equipment and type of service
e) Measurement data that reflect the radioactivity of each container and contaminated equipment (CPM, µSv/hour, Bq/gram);
f) Results of gamma radioactive surveys of the storage area

The storage site must be surveyed to ensure gamma radiation levels (µSv/hr) are within "safe levels" to workers and the general public. If safe levels are exceeded, then mitigation measures may include restricted entry, adequate spacing of containers or enlarging the storage area.

NORM is under provincial jurisdiction and the disposal of NORM contaminated wastes must be made with government approved agencies for each disposal.

The Area Supervisor, EH&S Advisor along with a 3rd Party Specialist shall be consulted before any disposal is planned.

11.8 Regulations

The Canadian Guidelines for the Management of Naturally Occurring Radioactive Material (NORM) set out annual dose limits for:

- Incidentally Exposed Workers; are workers whose regular duties do not include exposure to NORM
- Occupationally Exposed Workers are workers who are regularly exposed to NORM sources as a result of their regular duties.

Annual dose limits are summarized in the table below. In most cases oil and gas workers are classified as incidentally exposed workers. Incidentally exposed worker dose limits are the same for the general public.

Type of Worker	Organ / Tissue	Annual Dose Limit
Incidentally Exposed Worker **Occupationally Exposed Worker**	Whole Body	1,000 microsieverts (µSv) **20,000 microsieverts (µSv)**
Incidentally Exposed Worker **Occupationally Exposed Worker**	Hands and Feet	50,000 microsieverts (µSv) **500,000 microsieverts (µSv)**
Incidentally Exposed Worker **Occupationally Exposed Worker**	Skin	50,000 microsieverts (µSv) **500,000 microsieverts (µSv)**
Incidentally Exposed Worker **Occupationally Exposed Worker**	Lens of the Eye	15,000 microsieverts (µSv) **150,000 microsieverts (µSv)**

The above annual dose limits have no hourly, weekly or monthly limit. However it is required that any unnecessary and easily controlled exposure is not allowed and exposures must be kept to As Low As Reasonably Achievable (ALARA).

11.9 Transportation of Dangerous Goods (TDG)

The TDG regulations specify that radionuclides, associated with oil and gas produced NORM materials, with a total activity greater than 10 Becquerel per gram (10 Bq/gm) must comply with all TDG & CNSC (Canadian Nuclear Safety Commission) transport requirements. These include documentation, placarding, labelling, packaging, and monitoring of the package and the transporting vehicle.

There are also requirements for the transport of NORM materials that are < 10 Bq/gm that must be met. NORM contaminated materials being offered for transport must have their activity levels (Bq/gm or Bq/L) determined by a suitable laboratory. There are only a few laboratories that can perform these NORM analyses and measurements accurately.

In most cases, expert advice should be obtained before transportation off site. Transportation of NORM contaminated materials should be approved by the Area Supervisor, EH&S Advisor along with a 3rd Party Specialist.

11.10 Understanding NORM Radiation and Hazards

Radioactive materials are substances that contain radioactive elements that are unstable. These unstable elements are called radionuclides or radioisotopes. Radioisotopes have a nucleus that will emit subatomic particles or waves of energy in order to become stable. This process is called radioactive decay or disintegrations.

Over a period of time, the radioisotope will undergo a series of disintegration's to eventually become a stable element. The parent radioisotope, the radioisotope at the start of the disintegration chain, in NORM associated with the oil and gas industry is usually Radium or Radon.

Radium and radon are soluble and become mobile in geological fluids and can be found in produced water and may precipitate out in sludge and scales associated in oil and gas production. Radium, radon and their radioactive daughters emit alpha, beta and gamma radiation that are hazardous to human health.

11.11 Types of Radiation

1. Alpha Particles

An alpha particle is a relatively large and energetic subatomic particle that is ejected from the nucleus of an atom. Alpha particles only travel a few centimetres in air and are stopped by a paper and the outer layer of the skin therefore are not a hazard if they remain outside the body. However if alpha particles enter inside the body via ingestion, inhalation or open skin, they can do considerable biological damage as they have the potential to deposit in the majority of their energy in a localized area resulting in local tissue damage. Alpha particles present an internal hazard only.

2. Beta Particles

A beta particle is an ejected electron from an atom. Beta particles can travel greater distances than alpha particles but are stopped by plexiglass, steel pipes and vessel walls. The beta particles emitted from NORM have low – medium energies associated with them therefore most are readily absorbed by a worker's protective clothing (PPE). For the most part Beta particles present an internal hazard only. Like alpha particles, beta particles are most hazardous when NORM comes into direct contact with the internal organs via ingestion, inhalation and open skin.

3. Gamma Rays

When alpha and beta particles are ejected from the nucleus, there is often excess energy that must be given off to bring the nucleus into a more stable energy level. This excess energy is given off as intense, very short electromagnetic waves or rays. These waves are called gamma radiation or gamma rays.

Gamma radiation can travel long distances in air and can penetrate through steel equipment walls of pipe and vessels. Dense materials such as lead or steel will reduce, but never completely stop gamma radiation. Gamma rays can deliver a radiation dose to the body when the rays penetrate the skin and deliver a radiation dose to the radiation sensitive organs in torso part of the body and the head. The levels of gamma radiation measured form NORM are environmental levels that are easily controlled by using time and distance. Wearing protective shielding like lead aprons is not required. Most gamma rays present an external radiation hazard and to lesser extent an internal hazard.

11.12 Radiation Hazards

1. **External radiation hazard** – can be reduced and controlled by reducing the amount of time spent around radioactive materials, increasing the distance between workers and the radiation source and by the shielding of process equipment walls.

Radium and short lived radon daughters emit gamma radiation. Since gamma radiation can pass through steel, this is the radiation that is measured when gamma dose rates (µSv/hr) are measured on the exterior equipment surfaces as being potentially contaminated with NORM on the interior. Gamma exposures should be considered during routine oil and gas production however most of the measurements conducted at Harvest have indicated that radiation exposures to gamma radiation is very low and only a minor concern.

2. **Internal hazards** – internal radiation exposure occurs when radioactive materials are deposited into the body through inhalation, ingestion, absorption through open skin. Internal hazards can be controlled by wearing appropriate respiratory protection and personal protective clothing to avoid direct contact with NORM contamination.

Because alpha and beta particles do not travel through equipment walls, there is no chance of exposure to these particles unless the equipment is opened for inspection or repair.

When NORM contaminated dust particles are inhaled or ingested, the radioactive particle can come into direct contact with the organs. This allows the alpha and beta particles to travel a short distance and collide with tissue cells. This collision may damage the cell and kill it or cause cancerous tissue to develop.

3. **Environmental hazards** – Preplanning of activities and proper containment of NORM containment materials can minimize the impact of NORM on the environment. Proper NORM waste management procedures and policies are essential in order to protect the environment.

Summary

Radiation exposure may occur from two types of radiation - particle and electromagnetic rays.

Particle radiation exposures are not generally hazardous until the NORM contaminated material is inhaled or ingested. Precautions taken to prevent inhalation and ingestion therefore also prevent particle radiation exposure.

Gamma ray radiation can travel through dense materials and long distances. In the oil and gas industry, exposures to gamma radiation are generally low and are a minor concern.

11.13 Table 1 – Example of Site Specific NORM Control Procedures

Condition	Radiation Reading	Control Procedures	PPE Requirements
All Plant Areas and Wells except LPG/Propane /Butane process equipment	Background	Test every 3 years if last survey indicated NORM was not present. Test after any process change or after new wells from a different formation are brought on line.	None
LPG /Propane/ Butane process equipment	NA	Test Before Entering or Working on Equipment	
Testing Equipment while RUNNING @ Oil Battery Well Sites	Scintillation probe reading < 0.03 µSv/hr above background. Detect gamma radiation inside equipment by placing scintillation probe on contact with exterior equipment surface.	Control procedures not required	None for testing
	Scintillation probe reading ≥ 0.03 µSv/hr above background.	Control procedures & PPE required when opening equipment for repair or inspection.	None for testing
Testing Equipment while SHUT DOWN @ Oil Battery Well Sites	Scintillation probe reading ≥ 0.03 µSv/hr above background. Must Open Equipment for reading – test at open man way &/or equipment ports Detect gamma radiation by placing scintillation probe on contact with interior equipment surface or waste materials. Note: this measurement cannot be used for Gas Processing Equipment	Control procedures & PPE required when opening equipment for repair or inspection.	Supplied air or P100 HEPA respirator with disposable gloves. If entering confined space use disposable coveralls and rubber boots

Condition	Radiation Reading	Control Procedures	PPE Requirements
Testing Equipment while SHUT DOWN @ Oil Battery Gas Facilities Well Sites	Pancake probe reading < 200 CPM Must Open Equipment for reading – test at open man way &/or equipment ports Place pancake probe within 0.5 cm of interior equipment surface, waste materials	Must use respirator and hand protection until probe reading indicates there is NO NORM contamination	Supplied air or P100 HEPA respirator with disposable gloves. If entering confined space use disposable coveralls and rubber boots
Testing Equipment while SHUT DOWN @ Oil Battery Gas Facilities Well Sites	Pancake probe reading ≥ 200 CPM Must Open Equipment for reading – test at open man way &/or equipment ports Place pancake probe within 0.5 cm of interior equipment surface, waste materials	Must use respirator and hand protection if reading indicates the presence of NORM contamination Control procedures required for further work.	Supplied air or P100 HEPA respirator with disposable gloves. If entering confined space use disposable coveralls and rubber boots
Perform work on NORM Contaminated Equipment @ Oil Battery Gas Facilities	Probe readings • Scintillation probe readings ≥ 0.03 µSv/hr above background • Pancake probe readings of ≥ 200 CPM	1. Flag NORM area & restrict access 2. Cap/seal open ends of contaminated equipment 3. Cover ground to prevent soil contamination 4. If possible keep interior surfaces damp with water to prevent dust generation 5. Minimize NORM contaminated waste by separating NORM waste from non NORM waste 6. Use pancake and scintillation probe to identify NORM contaminated wastes (don PPE) 7. Label all NORM waste and keep records 8. Place NORM waste in secure areas 9. Monitor workers, PPE for NORM contamination 10. Practice good personal hygiene before eating, drinking or smoking	Minimum P100 HEPA respirator or supplied air for initial entry & clean out Disposable coveralls or rain gear Gloves- rubber or leather; - double layer of gloves may be necessary (also use surgical gloves) - Leather boots working outside equipment - Impervious rubber boots inside equipment

Condition	Radiation Reading	Control Procedures	PPE Requirements
Well Servicing	If data logging indicates there may be NORM contamination or if well is in an area known to experience NORM contamination or if past records indicate NORM contamination is possible Probe readings • Scintillation probe ≥ 0.03 µSv/hr above background on exterior equipment walls and waste materials (sludge/scales) • Pancake probe ≥ 200 CPM on exterior or interior equipment walls and waste materials (sludge/scales)	1. Assign a NORM Safety Officer to oversee the operation and to take NORM measurements 2. Measure gamma dose rates (scintillation probe) on each pipe, tubing, pump or tools extracted from well 3. Measure pancake CPM on downhole pump extracted from well 4. If NORM contaminated material is present: • Cap open ends of piping, tubing • Cover equipment and tools with heavy gauge plastic (16 mil minimum) and • For tubing place plastic sheets on ground when lying pipes down. Then use the ground sheets to wrap the pipe before transporting to storage. 5. Place wrapped equipment on pellets and secure with straps for transportation to the storage areas where measurement, labelling and documentation will take place.	Minimum P100 HEPA respirator when within 2m of opened NORM contaminated equipment Disposable coveralls or rain gear Gloves- rubber or leather; - double layer of gloves may be necessary (also use surgical gloves) - Leather boots working outside equipment - Impervious rubber boots when working in wet conditions

Appendix A – NORM Survey Procedure

Introduction:

NORM (Naturally Occurring Radioactive Material) is a natural source of radioactivity found in the earths crust. The concentration of NORM in its natural state is very low and in general does not pose any health hazards.

However, higher concentrations may rise significantly as a result of human intervention and industrial activities which is then termed Technically Enhanced Naturally Occurring Radioactive Materials or TENORM.

Dependant on the levels detected and potential worker exposure, hazards must identified and controlled and special precautions may be necessary to take into account for PPE, handling, storage, transportation, disposal, equipment and or process changes etc.

In order to determine the presence of NORM, surveys must be undertaken by qualified, trained and experienced (e.g., competent) workers and the findings documented for future reference.

Checking and Testing of NORMs Survey Equipment:

Prior to any use, the surveyor must perform four pre-operational checks to ensure that the equipment in functioning correctly.

1. Calibration Check: check the calibration sticker on the meter to ensure the instrument has been calibrated (along with the attached probe if applicable) by a CNSC agency within the past 12 months.
2. Battery Check: before, during and after survey
3. Physical Inspection: ensure the meter is not damaged, check the meter needle is zeroed when in OFF position, ensure needle moves freely, check meter housing, shake gently and listen for anything loose inside, check probe, cable, etc.
4. Response Test: perform bump check with licence exempt check source.

Gamma Survey Using Scintillation Detector:

To determine the presence of NORM inside equipment, the surveyor must take readings on contact with process equipment in order to identify any distinguishable measurements that are above background counts. If NORM's are detected on contact, further assessment is required on the interior equipment surfaces and or any materials contained within.

Action Levels: An Action level is ≥ 0.03 – 0.05µSv/hr above NORMAL background. Normal background is generally 0.05-0.12 µSv/hr.

a) Use the more restrictive rate of ≥ 0.03 µSv/hr when taking measurements against insulated equipment.

b) A Scintillation detector is far more sensitive to Gamma radiation than a Pancake detector. A Scintillation reading of 0.03-0.05 µSv/hr above NORMAL background on an external equipment wall would not be detected at all with a pancake detector.

Gamma Survey & Measurement Procedure:

1. Complete preliminary sections of survey form (e.g. location, surveyor name, type of survey, meter serial #, etc.)
2. Perform pre-operational checks on survey meter
3. Take background readings (usually between 0.05-0.12 µSv/hr) and document on form
4. Use "fast" response with audio on. In general, audio will respond faster than the needle. Start off with meter at X1 setting.
5. Place the detector at proper distance from surface to be measured. Generally 0.5m.

    - On contact with equipment to flag potentially NORM contaminated equipment
    - Take readings in any occupied areas in order to measure and calculate workers doses

6. If reading goes off the scale, go to the next highest range.
7. Use "slow" response in order to more accurate reading.

Direct Surface Contamination Survey with Pancake Detector:

DIRECT contamination surveys of surfaces or frisking of personnel involves scanning the surface of interest with a thin window Pancake GM Detector. This detector identifies the presence of alpha, beta and some gamma radiation.

A general rule of thumb is a reading ≥2 x NORMAL background (50-100CPM) is considered to be NORM contaminated.

When using a 15cm^2 Pancake detector, a reading of 200CPM to 250CPM (when including 50-100 NORMAL background) is = ~ 1 Bq/ cm^2 of surface contamination when detecting NORM's radionuclides in the oil and gas industry.

Action Levels: >1 Bq/ cm^2 of surface contamination is considered NORM contaminated and radiological restrictions apply (e.g. PPE, equipment relocation or disposal)

Direct Contamination Survey (using Pancake GM Detector) & Measurement Procedure:

1. Complete preliminary sections of survey for e.g. location, surveyor name, type of survey, meter serial #, etc.
2. Perform pre-operational checks on survey meter and remove protective screen from pancake detector
3. Take background readings (usually between ~ 50 to <) and document on form
4. Start off with the meter on the most sensitive range (X0.1)
5. Use “fast” response with audio on. In general, audio will respond faster than the needle.
6. Place the detector 0.5 to < 1cm over the surface to be surveyed in order to detect alpha and beta radiation
7. If readings are < 200CPM, radiological restrictions do not apply and NORM levels are acceptable.
8. If the reading is sustained and >200CPM, radiological restrictions apply.
9. If reading goes off the scale, use the next highest range (e.g. X 1)
10. Use “slow” response in order to more accurate reading.
11. Isolate and tag any item that are found to be contaminated

Note: If monitoring propane, ethane or NGL systems where radon contamination is suspected, the equipment should be purged of product and allowed to stand idle for minimum 4 hours (if possible one day) before the equipment is opened for monitoring. This will allow the radon daughters to disintegrate into less hazardous isotopes.

Additional Considerations for Frisking Personnel with Pancake GM Detector:

- Workers should be frisked at the workplace and before leaving the any potentially NORM contaminated areas
- Use “Audio” on and in fast response when frisking workers. Audio on allows surveyor to watch the location of the detector when conducting the survey
- If you are working alone, frisk your own hands first by having the pancake probe held in the clip on the meter – this prevents any potential cross contamination of the meter
- Avoid direct probe to skin contact when possible but do try to place probe as close to skin and body surfaces as you can.
- Move the detector at a slow and systematic rate to ensure complete coverage. A thorough and entire body frisk should take 3-5 minutes
- Monitor body parts and PPE.

    1. PPE - hard hat, gloves, boots and coveralls
    2. Body - Head, hair, exposed facial skin, neck, hands, feet, knees, elbows, forearms, shoulders, buttocks

    Note: Pay extra attention to dirty PPE and body parts

- Let the worker see the meter and explain the needle movement etc. Let them know the basics that>200CPM sustained is considered to be contaminated and <200CPM is “clean”
- Only qualified, trained and experienced (e.g., competent) workers should conduct personnel monitoring. Ensure that Confined Space guards, safety watch etc are trained to conducted surveys when workers exit any confined space where NORMs may be present.
- Instruct surveyor to contact Area Supervisor when worker contamination is detected as showering and PPE disposal will be necessary
- Total skin decontamination to background level must be achieved and not to the minimum 200CPM

Safety Precautions:

Unless otherwise specified, the majority of NORM survey meters are not intrinsically safe therefore surveyors must obtain a “Safe Work Agreement for Hot Work” if the survey is to be conducted in potentially explosives atmospheres.

If an explosive atmosphere is present and a test must be performed, the surveyor will conduct a swipe test. A swipe test consist of taking representative sample of the area to be surveyed by swiping it with a strip of duct tape then testing the tape in a safe, non-explosive atmosphere.

In order to protect yourself and workers, remember that the goal of NORM’s detection and management is:

A.L.A.R.A = As Low As Reasonably Achievable

A simple rule to remember is:

T.D.S = Time, Distance and Shielding

- **Time = Limit your exposure time**
- **Distance = Keep as much distance between yourself and potential NORM’s contamination**
- **Shielding = Ensure you have appropriate shielding. In most cases the use of the correct PPE provides more than enough shielding to protect a worker from contamination.**

Appendix B - NORM Storage Site Design and Containment

1. Containers and equipment containing NORM shall be stored in a secure (fenced) area with limited access.
2. The site must also be bermed and should have an impermeable barrier.
3. NORM materials with higher radiation levels should be stored near the centre of the area to reduce radiation levels at the storage area perimeter.
4. The storage area shall be sized so that radiation levels do not exceed 2.5 µSv/hour above background to workers and 0.15 µSv/hour above background to the general public.
5. Containers and equipment containing NORM material must be recorded and secured against unauthorized removal from the storage site.
6. Loose NORM such as scale and sludge shall be stored in sealed and marked containers on pallets or racks.
7. All openings on stored equipment or tubing containing NORM shall be capped, plugged or wrapped in plastic to prevent the spread and release of NORM.
8. Quarterly inspections shall be performed to identify leaking or corroded containers which must be immediately repacked or sealed.
9. Personnel who enter NORM storage areas shall be informed of the presence of radioactive materials, the safety hazards associated with the material and the methods of controlling exposures.
10. All entrances to NORM storage areas shall be identified with a sign bearing the three-bladed radiation symbol and the words:

CAUTION RADIOACTIVE MATERIAL STORAGE AREA

11. If the dose rate at any point within the storage area exceeds 2.5 µSv/hr, the sign shall contain the words:

RAYONNEMENT DANGER RADIATION

12. Records of waste materials/containers shall be maintained to document at least the following information:

    a) The type of material (scale, sludge, PPE, equipment, etc.);
    b) The date the material entered storage;
    c) The original location of material or equipment and type of service;
    d) Measurement data that reflect the radioactivity of each container (CPM, µSv/hour, Bq/gram, Bq/Litre); and
    e) Results of radioactive surveys of the storage area.

Appendix C Entering NORM Contaminated Equipment/Vessels

1. In NORM contaminated sites monitor the gamma dose rates of the vessel / equipment walls and contents before and after opening.
2. All identified equipment / vessels identified as being NORM contaminated (via NORM testing mentioned in Appendix A) shall be labelled as NORM contaminated to warn personnel.
3. If equipment is contaminated with radon gas such as found in propane systems, it should be purged of product and allowed to stand idle for minimum 4 hrs (if possible 1 day), to allow the radon daughters to disintegrate into less hazardous radioisotopes.
4. For initial vessel entry, inspection, and monitoring use SCBA/SABA.
5. To protect against NORM, personnel shall wear:

    a) Leather or rubber gloves (double gloving with surgical gloves may be necessary)
    b) Washable boots (safety toed rubber boots);
    c) Disposable coveralls or rain gear;
    d) Cartridge respirators equipped with High Efficiency Particulate Arrestor (HEPA) filters suitable for radionuclides must be worn as a minimum. SCBA or air supplied respirator is required if the vessel is oxygen deficient or has not been tested for oxygen.

6. Immediate area where work on NORM contaminated materials is performed shall be flagged/signed and restricted to prevent unauthorized entry.
7. Cap open ends of pipes or equipment with plastic to prevent undue spreading of NORM.
8. Spread ground covers to capture NORM contaminated materials when there is a likelihood of contaminating the ground.
9. Keep NORM materials damp, but not wet to prevent dust generation and undue quantities of contaminated waste water.
10. If grinding, drilling, polishing or welding is to being performed:

    - respiratory protection is still required even if the material is wet
    - in enclosed spaces such as maintenance shops, local ventilation shall be used to remove NORM contaminated dust from the atmosphere

11. Any decontamination of contaminated rubber gloves, respirators, coveralls, boots, cleaning rags, and tools should be conducted by 3rd Party Specialist. If decontamination is not possible, the material must be:

    - Placed and sealed in double bags
    - Held for proper disposal with other NORM contaminated materials.

12. Put NORM contaminated materials in sealed containers and place in storage. The container shall be labelled with:

"WARNING"

NATURALLY OCCURRING RADIOACTIVE MATERIALS

AVOID BREATHING DUSTS & DIRECT CONTACT

13. Contaminated equipment or material shall not leave the site until it has been properly sealed for storage, transport or disposal.

14. All personnel should be checked for NORM contamination using a pancake detector before leaving the NORM work area.

15. Personnel shall prevent any possible ingestion of NORM contaminated material by observing good personal hygiene and wash face and hands before eating, drinking, smoking and applying cosmetics.

RESPIRATORY PROTECTION

12.0 RESPIRATORY PROTECTION

12.1 Introduction

The purpose of this Code of Practice (COP) is to ensure that workers' health is protected where respiratory protection is required, and that the proper type of respirator is employed correctly.

This COP applies to all workers when engaged in activities requiring respiratory protection. Contractors and subcontractors bringing any respirator for use on Harvest Operations Corp (Harvest) worksites shall demonstrate that their employees meet or exceed the provisions of this code.

For the purpose of this COP, respiratory protective equipment includes SABA (Supplied Air Breathing Apparatus), SCBA (Self Contained Breathing Apparatus), dust, fume and mist respirators, chemical cartridge or combination chemical cartridge respirators (air purifying respirators) and protective suits totally encapsulating the wearer's body that incorporates a supplied air system. It does not include underwater breathing devices, aircraft oxygen systems, military masks, inhalators or resuscitators.

Respiratory protection shall be used when there is a risk that the atmosphere may pose a hazard to the worker. Workers shall wear respiratory protection as identified in Appendix "A", Health Hazard Identification of this code.

12.2 Administration

The worksite supervisor will be responsible for the overall administration of this COP including, but not limited to:

a) Ensuring adequate respiratory protection equipment is available, personnel receive appropriate training, that fit-testing is regularly conducted (minimum annually based on CSA and BC requirements), and record keeping is maintained.
b) Ensuring that Corrective Lenses are provided, where required and upon request, to employees who are required to routinely wear full face piece respirators. This will also apply to full-time contractors and subcontractors who utilize Harvest respiratory protection equipment on site, with approval from the worksite supervisor.

The lead operator will be responsible for coordinating the cleaning, maintenance, repairing, and storage of respiratory protection equipment.

12.3 Health Hazard Identification and Controls

Appendix "A" identifies typical respiratory hazards encountered in production operations. For each hazard, conditions under which respiratory protection is required are specified as well as the proper type of respirator. For situations not listed here, or for further information on any chemical, refer to your SDS manual, or contact the Safety Advisor for further guidance regarding respiratory protection.

For sites with specific hazards not identified here, the site will need to add the hazards to the list, and identify locations where hazards may be encountered along with Appropriate Controls.

12.4 Types of Respiratory Equipment

12.4.1 Supplied Air Systems

1. Supplied Air, Positive Pressure, with Escape Pak (SABA) or Self Contained Breathing Apparatus, Positive Pressure (SCBA).

Uses:

a) IDLH (immediately dangerous to life or health) and/or oxygen deficient atmospheres,
b) Entry into confined spaces that have not been tested or cleaned,
c) Hydrogen sulphide atmospheres in excess of 10 ppm,
d) During emergency rescue operations in confined spaces or toxic atmospheres,
e) Operations that might involve contact with toxic contaminants or unknown toxic contaminants (e.g., opening piping flanges, relieve valves, etc)

12.4.2 Air Purifying Respirators

Air purifying respirators must not be used in oxygen deficient or IDLH environments.

1. Air Purifying Respirators, equipped with HEPA filters.

Uses:

a) During asbestos abatement activities and welding operations involving stainless steel or galvanized.

2. **Air Purifying Respirators, equipped with Organic Vapor Cartridge, also referred to as Chemical Cartridge Filters.**

   Uses:

   a) For airborne aerosols including all dusts, mists, metal fumes, smoke,
   b) For low concentrations of organic vapors and gasses such as; alkaline and acid gases, mercury vapors, pesticides, paint vapors, or any combination of above materials,
   c) Can also be used for any of the above in combination with dusts, fumes and mists, if suitable mechanical pre-filter is used as well.

3. **Air Purifying Respirator, equipped with Dust, Mist Cartridge, also referred to as Mechanical Filters.**

   Uses:

   a) Work involving sulfur dust, removing gaskets, and refractory insulation.

12.5 Respirator Fit

1. All personnel required to wear a respirator, as part of their job (including occasional use) will be subject to a qualitative and/or quantitative fit test for each type of respirator they may be required to wear.
2. Users of negative pressure respirators shall undergo a qualitative and/or quantitative fit test upon commencement of employment. Routine users are required to have annual fit tests conducted every year thereafter as per CSA & BC Reg's.
3. Users of positive pressure respirators shall undergo a qualitative and/or quantitative fit test upon commencement of employment. Routine users are required to have annual fit tests conducted every year thereafter as per CSA & BC Reg's.
4. Facial hair including beards, excessive mustaches, goatees and excessive sideburns prevent effective respirator seal and shall not be permitted on personnel who may be required to wear respirators.
5. The irritant smoke or isoamyl acetate (banana oil) test shall be used for qualitative fit testing. The procedure for the irritant smoke test is as follows:

   a) The irritant test can be used for both air purifying and atmosphere-supplied respirators. When an air purifying respirator is tested, it should be equipped with a high efficiency filter. The irritant smoke is produced by air flowing through a commercially available smoke tube normally used to check the performance of ventilation systems. Adequate local or general ventilation should be provided to prevent contaminating the room where the test is carried out.

b) The respirator wearer should keep his or her eyes closed during the test, even if the respirator offers eye protection. If the respirator wearer detects the penetration of smoke into the respirator during the test, they should be permitted to readjust the seal of the respirator.

c) The person operating the smoke tube directs smoke over the respirator, keeping the smoke tube about 600mm from the respirator, and the test operator watches the reactions of the respirator wearer. If the respirator wearer does not detect penetration of smoke, the tube should be moved closer to the respirator and the test operator should observe the reactions of the respirator wearer.

d) When the smoke tube has been moved to within 150mm of the respirator, and the respirator wearer still has not detected penetration of smoke into the respirator, the smoke may be directed at potential sources of leakage in the seal of the respirator to the wearer. If the respirator wearer still does not detect penetration of the smoke into the respirator, he or she should carry out a series of exercises such as:

- deep breathing
- turning the head from side to side
- nodding the head up and down
- talking while smoke is directed at the respirator

e) If the respirator wearer is unable to detect the penetration of smoke into the respirator, he or she has achieved a satisfactory fit with the respirator.

Note: A similar procedure can be used for isoamyl acetate (banana oil) test.

f) A negative pressure fit test will be performed by the wearer each time a respirator is worn. This fit test is conducted by placing the mask on the wearer's face and holding the air supply hose shut, prior to attaching it to the air supply. Breathing in will draw the mask against the wearer's face and the seal can then be confirmed.

g) A record of fit testing shall be kept at the site for each employee including:

- name
- date
- type of respirator and size
- type of test, and test agent
- indication that test was successful
- additional comments or problems
- name of person providing testing

12.6 Training

Respirator training will be done upon commencement of employment or reassignment to a new department and every three years thereafter.

The worksite supervisor will be responsible for ensuring that workers in their area are trained in the proper inspection, fit-testing, use, maintenance and storage of each type of respirator. This training shall be conducted by competent personnel such as manufacturer's representatives, Safety Advisors, Industrial Hygienists or through H_2S Alive or equivalent courses.

Training will be provided to all applicable workers and will include:

a) visual inspection procedures for each type of respiratory protection
b) limitations of each type of respirator protection
c) location of respiratory protection at the facility
d) proper use of the respiratory protection
e) explanation of qualitative fit-testing
f) procedure for a negative pressure fit-test
g) proper maintenance practices

A record of all training shall be kept at the site for each employee including:

a) name
b) date
c) type of equipment trained on
d) training performed

12.7 Cleaning of Respirators

a) Respirators shall be cleaned and disinfected after each use (For personally issued respirators this should be done weekly).
b) Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts. Repairs must be done by a person trained and certified for the level of work being done.
c) Wash components in 50OC water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
d) Rinse components thoroughly in clean, warm (50OC maximum), preferably running water. Drain thoroughly.

e) Where the cleaner does not contain a sanitizing agent, respirator components should be immersed for 2 minutes in one of the following:

- Hypochlorite solution (50 ppm/v of chlorine) made by adding approximately 1 ml of laundry bleach to 1 litre of water at 50^{O}C; or
- Aqueous solution of iodine (50 ppm/v iodine) made by adding approximately 0.8 ml of tincture of iodine to 1 litre of water at 50^{O}C.

f) Rinse components thoroughly in clean, warm (50^{O}C maximum), preferably running water. Drain thoroughly. The importance of thorough rinsing cannot be over-emphasized. Detergents or sanitizers that dry on face pieces may result in dermatitis. In addition, some sanitizers may cause deterioration of rubber or corrosion of metal parts if not completely removed.

g) Components should be hand-dried with a clean lint-free cloth or air-dried.

h) Reassemble face pieces, replacing filters, cartridges, and canisters where necessary.

- It is recommended that the face piece be stored in a clean plastic bag or equivalent.

i) Test the respirator to ensure that all components work properly.

- If skin contact is made during the above test, clean area components with antiseptic swab.

12.8 Maintenance of Respirators

a) The user/wearer is responsible for cleaning, inspection & storage of the respirator after each use according to manufacturer's guidelines. The guidelines will be kept with the equipment or stored in a centrally located area to ensure all applicable workers have access to them.

Note: Repairs must be done by a person trained and certified for the level of work being done.

b) A monthly inspection of the respirator will include verification that:

- it is readily accessible for use
- it is isolated from dirt or any contaminants by the container provided for that purpose
- it is free from physical damage including cracks, tears, holes, and scratched eyepieces
- all rubber parts are flexible
- in the case of SCBA's the air pressure is satisfactory
- cartridges have not surpassed their dated shelf life

c) The Worksite Supervisor will ensure that all hydro testing of respiratory protection equipment is done every 3 years for fibre wrapped cylinders, every 5 years for steel cylinders, and every 10 years for cascade cylinders.

d) The Worksite Supervisor shall ensure that the air is changed and/or tested every 12 months as per CSA Regulations for steel SCBA cylinders (This could be accomplished by utilizing the SCBA systems for training at least annually). Air changes and/or testing is not required for steel cascade systems, steel portable work mask cylinders (SABA) or aluminum cylinders.

e) Suppliers of compressed breathing air including Company facilities shall ensure the air meets the purity requirements of Canadian Standards Association Standard (CSA) Z180.1, Compressed Breathing Air. Documentation should accompany a cylinder to support the purity standard following a refill. Breathing air from Company air compressor systems shall be tested every 12 months to ensure that it complies with CSA Standard CAN3-Z180.1. Tables 1 and 2 taken from CSA Standard CAN3-Z180.1 are included in this document, and may be referred to for breathing air quality.

f) A record of all maintenance on respirators will be kept by the site including:

- date of last air cylinder refill
- specific type of work done
- any special findings
- parts replaced

g) A record of monthly visual inspections of respirators will be kept by the site.

h) Visual inspection of the respirator prior to use is the responsibility of the user/wearer.

12.9 Storage of Respirators

Respiratory protective equipment should be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture or damaging chemicals. Special attention should be paid to inspection and maintenance of any equipment, which must be stored in these conditions.

Respirators placed in work areas should be stored in clearly marked containers, which are readily accessible at all times.

Respirators stored in lockers or tool boxes should be protected from contamination, distortion, and damage.

12.10 Average Composition of Normal Air

Average Composition of Normal Air of the Lower Atmosphere

Gas Component	Major (L/m3)	Per Cent by Volume	Minor (mL/n3)
Nitrogen	780.9	78.09	--
Oxygen	209.5	20.95	--
Argon	9.3	0.93	--
Carbon Dioxide	--	--	300.0
Neon	--	--	18.0
Helium	--	--	5.2
Methane	--	--	2.2
Krypton	--	--	1.0
Nitrous Oxide	--	--	1.0
Hydrogen	--	--	0.5
Xenon	--	--	0.03

Note: $1mL/m^3$ is equivalent to 1 ppm. CAN3-Z180.1

12.11 Table 2: Breathing Air Maximum Allowable Concentration of Contaminants

Compressed Breathing Air and Systems

Breathing Air-Maximum Allowable Concentration of Contaminants (by Volume, Measured at 21° C (69° F) and 101.3 kPa (14.7 psig))

Contaminant	Concentration
Carbon Monoxide	5 mL/m^3 *
Carbon dioxide	500 mL/m^3
Methane	25 mL/m^3
Non-methane hydrocarbons	†
Nitrogen dioxide	0.3 mL/m^3
Nitrous oxide	2.5 mL/m^3
Halogenated hydrocarbons: • Trichlorotrifluoroethane • Dichlorodifluoromethane • Chlorodifluoromethane	5 mL/m^3
Oil, particulates, and condensates	1 mg/m^3
Water	(a) The dew-point at line pressure shall be at least 5° C (9° F) below the minimum temperature to which any part of the breathing air system is exposed at any season of the year. (b) Under no circumstances shall the dew point exceed -53° C for systems at or above 12.4 mPa (1800 psi).
Odour	Free of any detectable odour.
Others †	

* 1 mL/m^3 = 1 ppm by volume.

† Contaminants other than those listed in Table 2 shall not exceed the odour threshold of 1/10 of the current Threshold Limit Value documented by the American Conference of Government Industrial Hygienists (ACGIH). The threshold limit value for total combined mixtures of contaminants as documented in current Threshold Limit Values (TLV's) for Chemical Substances and Physical Agents in Workroom Environment with Intended Changes of ACGIH shall apply. The values used in calculating mixtures shall be as in Table 2 or 1/10 of the current Threshold Limit Value as documented by ACGIH.

Note: The failure of any component to meet the purity requirements shown in Table 2 shall constitute failure of the sample being analyzed. CAN3-Z180.1

12.12 Addendum: Breathing Air Cylinders, Purity, Supply Hoses & Emergency Units

1. Breathing Air Cylinders - Minimum Pressure

All SCBA cylinders must be full prior to use, (2216 PSIG for 30 minute units) unless they are designed as work units.

If such units are designed as work units the following must apply:

a) The units must be identified as a work unit only.
b) The site shall document a procedure to ensure everyone is aware of the difference between an “Emergency” and a “Work” unit.
c) Tasks may commence using a work unit as long as the cylinder pressure is not less the 1200 PSIG when the task starts.
d) Wearer should estimate time required to complete a task and complete the task without the low pressure alarm sounding.
e) Rule of thumb is 100 PSIG/minute rates of usage plus 500 PSIG left in cylinder when empty.

2. Air Purity

Suppliers of compressed breathing air, including Company facilities, shall ensure the air meets the purity requirements of Canadian Standards Association (CSA) Z180.1, Compressed Breathing Air. Documentation should accompany a cylinder filled off site to support the purity standard. Table 1 and 2 of CSA Standard CAN3-Z180.1 are included in the Respiratory Protection COP and may be referred to for breathing air quality.

3. Air Supply Hoses for Airline Work Units

Air supply hoses must meet the following criteria to be approved for use on the work site.

a) Hose must be purchased and matched with the specific type and make of mask that was used for NIOSH approval purposes - e.g. “Scott” hose with “Scott” mask.

OR

b) Hoses that are approved in writing for breathing air use by the local jurisdictional agency. In Alberta it is Occupational Health and Safety (OH&S).

Some Alberta distributors/manufacturers have obtained this approval by having their product tested to a specified standard.

4. "Emergency Units" versus "Work Units" Procedure

Where applicable, the site should identify the SCBA units on the site plot plan that are considered "Emergency Units" and these must be kept full at (2216 PSIG for 30 minute units) as per the “Addendum” in this Respiratory Protection COP.

All other SCBA units on site are deemed to be "Work Units" and will be maintained according to the "Addendum" in this Respiratory Protection COP.

The SCBA units carried in the field vehicles are deemed to be "Work Units" and will be maintained according to the "Addendum" in this Respiratory Protection COP.

Note: Under no circumstances shall any task commence using a SCBA "Work Unit" that has less than 1200 PSIG.

Appendix A Health Hazard Identification

Respiratory Hazards and Appropriate Protection Requirements

The following table identifies respiratory hazards normally associated with petroleum operations. For each hazard, conditions under which respiratory protection is required are specified as well as the proper type of respirator. For situations not listed, or for further information on any chemical, refer to your MSDS manual, or contact the Safety Coordinator for further guidance regarding respiratory protection.

"For sites with specific hazards not identified here, the site will need to add the Hazard to this list, and Identify locations where Hazard may be encountered along with Appropriate Controls".

Hazard (1)	Type of Respiratory Protection Recommended	Area/Conditions Where Hazards May Exist	Comments
Asbestos / MMMF Insulation	Full face disposable cartridge respirator equipped with HEPA (P100) cartridges (Asbestos approved).	Process piping, vessels, etc in older facilities.	Must have appropriate PPE. Follow Asbestos Handling Guidelines.
Asphyxiants (Carbon Dioxide (CO_2), Nitrogen, etc)	None normally required if ventilation adequate. If required, use SCBA or SABA (4).	Common facilities, Fire Extinguishers, Purging, etc	Will displace air and cause asphyxiation.
Benzene	None required under 0.5 PPM; 0.5 - 5 PPM use Half face cartridge respirator equipped with organic vapor cartridge; over 5 PPM use SCBA or SABA (4).	Gas streams, Compressor scrubbers, (Found in most crude oil and condensate and Glycol Dehy vents). Also often in treater buildings if open containers left sitting around.	Known Carcinogen and reproductive hazard. Use skin protection. Keep contaminated clothing/PPE out of confined area such as cab of vehicle or office trailer.
Caustics / Acids	None normally required. If required, use SCBA or SABA (4).	Well servicing, Chemical cleaning in contactor's, dehy's, filters, screens, boilers, etc.	Mostly a problem when in misty form (misty atmospheres). Eye and Skin protection required.
Chemicals (oilfield) (Biocides, Demulsifiers, Corrosion Inh, Scale Inh, Oxygen Scavengers, Wax dispersants, etc)	None normally required, if used in well ventilated area. If required, use half face cartridge respirator equipped with suitable cartridges for organic vapours and pre-filter to extend life. Refer to MSDS for Respiratory requirements.	All operations where chemicals are used for treating purposes.	Read MSDS very carefully for all chemicals as some can be very dangerous, biocides in particular. Corrosion inhibitors may have Methanol, Isopropynol, Dimethylamine, Ammonium Bisulphite, etc. Some demulsifiers may have Ethylene Isobutyl Ketone, etc. Eye and Skin protection required. Toluene, Xylene are possible ingredients in these chemicals. Toluene is a reproductive hazard.

Health Hazard Identification (cont'd)

Hazard	Type of Respiratory Protection Recommended	Area/Conditions Where Hazards May Exist	Comments
Chemicals (plants) (amine, glycol, acetic acid, solvents, etc)	None normally required if adequate ventilation. Otherwise use Half face cartridge respirator equipped with organic vapor cartridge and pre-filter (specific to components of chemical involved).	Anywhere chemicals are handled or create a chemical reaction or are heated or misted. H_2S analyzers	Must review MSDS's for all chemicals prior to handling. Eye and Skin protection required.
Herbicides	None normally required if sufficient ventilation. Half face cartridge respirator with appropriate HEPA filter cartridges.	Mixing and spraying herbicides.	Required when ventilation is inadequate or you are downwind of spray. (See MSDS's for details).
Hydrocarbon Vapours (condensates, oils, fuels, etc)	None normally required, if adequate ventilation. Half face cartridge respirator with organic vapour cartridges, when required, or SCBA or SABA (4) used in case of leak or equipment failure or turnaround activity. Airline respirators required for areas above 10% LEL. No work allowed in areas greater than 20% LEL.	All production operations (breaking flanges where vapours and gases may be released or confined areas with poor ventilation). Portable equipment.	Must have monitors available for early detection. Maintain adequate ventilation and limit exposure duration too less than 15 minutes.
Hydrogen Sulfide (Sour condensate, crude oil, prod water, gas, etc)	SCBA or SABA (4) in order to work in concentrations above 10 PPM (5 PPM in BC).	In sour (H_2S) production operations, plant and field. Wells, pipelines, vessels, tanks, & tank trucks.	Required for exposure over 10 PPM (5ppm in BC). Required when concentrations not known.
Laboratories (acetic acid, acetone, waste cans, etc)	Certified lab fume hood required.	Labs.	Follow laboratory safety procedures.
Methanol	None normally required if using in well ventilated area. When required, use SCBA or SABA (4). (Cannot use cartridge respirators for methanol).	Injection for hydrate removal, chemical pumps, fuel systems, etc.	Use skin protection when handling methanol. Keep contaminated clothing/PPE out of confined area such as cab of vehicle or office trailer.
Nuisance Dusts (Fibreglass Insulation, Silica gel, Solka floc, Solid sulphur, etc)	None normally required. If required, use Disposable Dust Masks or Half face cartridge respirator equipped with filters suitable for nuisance dusts.	When in enclosed spaces, high wind conditions, catalyst changes, process piping/vessels, dehy towers, etc.	Not normally required if materials are handled wet.
Nuisance Odours (dimethyldisulphide, etc)	None normally required. If required use Disposable Mechanical Organic Filter Type for Non-IDLH atmospheres, otherwise use SCBA or SABA (4).	Around oil and gas production operations, chemical handling, etc.	
Nuisance Particulates (Desiccant - Molecular Sieve)	None normally required. Half face cartridge respirator with appropriate HEPA filter cartridges and pre-filter to extend life. If in enclosed or confined space use SABA (4).	Activated carbon, preco floc silica gel, activated alumina, charcoal,	Not required while handling wet.

Health Hazard Identification (cont'd)

Hazard	Type of Respiratory Protection Recommended	Area/Conditions Where Hazards May Exist	Comments
O_2 Deficiency	SCBA or SABA (4)	Confined spaces, valve culverts, root cellars, etc	Use personal monitor to confirm O_2 content before entry.
Paint Vapours (Other than Urethane)	If using brush, none normally required. If spray painting with compressed air, use Half face cartridge respirator with organic vapour cartridges and pre-filter.	Painting.	Required when ventilation is inadequate or you are downwind of spray. (See MSDS's for details).
Paint Vapours (Urethane)	If using 1 part paint, none normally required if brushing in ventilated area. If using 2 part paint, with a brush or spray painting 1 or 2 part paint with compressed air, use half mask airline respirator or equivalent.	Painting.	See MSDS's for details.
PCB's	None normally required. If temperature of PCB's exceeds ambient temperature, use SCBA or SABA (4)	When handling PCB filled equipment (transformers, lightning arrestors, surge capacitors, etc.) or spills.	Also use rubber gloves and aprons.
Propane, Ethane, Methane, Butane, NGL's	None normally required if ventilation adequate. If required, use SCBA or SABA (4).	Common Facilities, Gas Streams	Follow Light Hydrocarbon building entry procedures.
Sandblasting (major jobs, not enclosed)	Approved sand blasting hood with airline for Non-IDLH areas, otherwise use SABA (4).	Cleaning & Sandblasting operations	If lead based paints suspected, consult an Industrial Hygienist.
Toxic Vapours $S0_2$, Ammonia,	Required if exposure will be over OEL (SO_2 = 2 PPM, NH_3, = 25 PPM etc). Where required, use SCBA or SABA (4). Note: If you have chlorine on site you must consult an Industrial Hygienist.	Breaking piping, vessel integrity where vapours and gases may be released. Sulphur trains in plants. Sampling, repairing in sulphur utilities.	None normally required for SO_2 unless exposure over 2 PPM. If handling Ammonia in higher concentrations and/or enclosed spaces use SCBA or SABA (4).
Welding / Cutting Fumes	Half face respirator equipped with cartridges for welding fumes. (Approved for Metal Fumes). P95 cartridge minimum for welding on steel or aluminum.	Welding, cutting, heating, in any area. (Especially enclosed areas such as shops, buildings, tanks, etc.).	Must review MSDS before welding, cutting or grinding any alloy materials such as stainless, chrome molly, galvanized, etc. Also be aware of what may be released from the metal when heated, such as H_2S.

Notes:
1) Respiratory protection (as with all personal protective equipment) should be used as a last resort only when all other means of control have been considered, including proper ventilation.
2) In emergency situations in IDLH (Immediately Dangerous to Life or Health) atmospheres, SCBA must be used. Greater than 20% LEL, no entry allowed.
3) If concentrations exceed allowable maximum use values for air purifying equipment, then you will have to use respiratory protective equipment with a higher protection factor.
4) All Breathing Apparatus must be Positive Pressure models. SCBA (Self-Contained Breathing Apparatus), SABA (Supplied Air Breathing Apparatus) c/w Work Mask with Egress Cylinder.
5) IDLH (Immediately Dangerous to Life and Health) includes O_2 Deficient Atmospheres with less than 19.5% oxygen and atmospheres approaching LEL (Lower Explosive Limit) concentrations.

SAFE WORK AGREEMENT SYSTEM

13.0 SAFE WORK AGREEMENT SYSTEM

13.1 Policy

The Safe Work Agreement System must be applied when any third party work is being conducted on any Harvest Operations Corp. (Harvest) property.

13.2 Introduction

The purpose of this guideline is to ensure consistent application of the Safe Work Agreement System throughout Harvest.

Note: The first consideration is to establish the Prime Contractor for the work area. Unless otherwise agreed upon and documented, Harvest will be considered the Prime Contractor.

If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.

Applying the Safe Work Agreement System assigns responsibilities and generates a legal and binding contract that facilitates the following:

a) Identifies who is in charge of a worksite
b) Defines the scope of work
c) Communicates the expectations for working at a Harvest worksite
d) Identifies hazards and necessary controls
e) Specifies hot work requirements
f) The appropriate approval to proceed with work is obtained

13.3 Training

All personnel responsible for issuing work agreements must receive formal training on the Harvest Safe Work Agreement System and the Hazard Identification, Assessment and Control process.

Safe Work Agreement System training must be completed every year or more often if there are changes to the program or as deemed necessary.

13.4 Responsibilities

13.4.1 Superintendent or Manager

a) Provide guidance to Worksite Supervisors, Foreman, Lead Operators and Operators regarding completing safe work agreements
b) Identify contractors that require term safe work agreements

c) Issue term safe work agreements to contractors or appoint a designated Harvest representative to do so
d) Evaluate completed safe work agreements on a regular basis or appoint a designate to do so
e) Participate in the site specific orientation & hazard assessment process
f) Verify the Notice of Worksite Supervisor form is completed and readily available (only required in Saskatchewan; optional in Alberta and British Columbia).

13.4.2 Foreman / Lead Operator, Project Manager

a) Issue safe work agreements to contractors and subcontractors or other personnel as required
b) Provide supervision as required when issuing a safe work agreement
c) Evaluate completed safe work agreements as part of the inspection process
d) Participate in issuing term safe work agreements
e) Provide guidance to operators, contractors and worksite consultants regarding completing work agreements
f) Retain completed safe work agreements as required (2 years)
g) Participate in the hazard assessment process
h) Verify “Notice of Worksite Supervisor Form” is completed and readily available (only required in Saskatchewan; optional in Alberta and British Columbia)

13.4.3 Operators

a) Issue work agreements to contractors or other personnel as required
b) Ensure issued work agreements are returned as required
c) Participate in the hazard assessment process
d) Communicate the hazards of a worksite to the Receiver
e) Implement hazard controls as identified on the work agreement
f) Participate in issuing term safe work agreements
g) Explain the transfer of responsibility to the Receiver when issuing turnover agreements
h) Conduct pre-job safety meetings as required
i) Provide supervision as required when issuing work agreements
j) Verify “Notice of Worksite Supervisor Form” is completed and readily available (only required in Saskatchewan; optional in Alberta and British Columbia)

13.4.4 Worksite Supervisor

a) Contact and meet area operations personnel before commencing work
b) Complete an appropriate safe work agreement with area operations personnel
c) Adhere to all conditions identified on the safe work agreement

d) Conduct a site specific orientation & hazard assessment
e) Communicate identified hazards and controls to all workers involved
f) Conduct a daily pre-job safety meeting
g) Ensure all required controls are implemented before work proceeds
h) Complete appropriate safe work agreements according to the safe work agreement flowchart
i) Verify Notice of Worksite Supervisor form is completed and readily available (only required in Saskatchewan; optional in Alberta and British Columbia)

13.4.5 EHS Advisors

a) Provide training regarding the Safe Work Agreement System
b) Evaluate completed safe work agreements as part of the inspection process
c) Participate in issuing term safe work agreements
d) Provide guidance to operators, contractors, subcontractors and worksite supervisors regarding completing safe work agreements
e) Provide guidance regarding site specific orientation & hazard assessment
f) Provide guidance regarding regulatory requirements

13.5 Safe Work Agreement System

The Safe Work Agreement System is an effective risk management tool and a means of implementing the 10 Key Principles. To ensure the Safe Work Agreement System is used consistently and effectively, the following steps will apply to all third party work:

a) Contact the Operations Area Foreman/Alternate prior to starting work.
b) Review the Process to Determine Operating Authority (Worksite Responsibilities) flowchart
c) Identify the Worksite Supervisor.
d) Identify the appropriate type of safe work agreement to be completed.
e) Complete the appropriate safe work agreement.
f) Completed a site specific orientation & hazard assessment
g) Complete the work identified on the agreement. Stop work if the job scope changes and re-assess.
h) Return a copy of the safe work agreement and other requested documents to the Issuer

13.6 Safe Work Agreements

There are primarily four types of safe work agreements:

1. Turnover
2. Cold Work
3. Hot Work
4. Term

Each primary type of safe work agreement may be supplemented by additional documents:

a) Ground Disturbance Checklist
b) Confined Space Entry Permit
c) Working in Proximity to Overhead Power-lines Form
d) Enform - Electronic General Safety Orientation (eGSO)
e) Fall Protection Plan
f) Critical Lift Plan
g) Job Safety Analysis (JSA)
h) Lockout – Tagout (Zero Energy) Form

Harvest has created a standard safe work agreement form that can be used to prepare each type of safe work agreement. Safe work agreement books will be provided to workers that are responsible for issuing work agreements. A safe work agreement form is also provided in Section 8; Forms.

13.6.1 Turnover Safe Work Agreement

1. Purpose

The purpose of the Turnover Agreement is to assign/transfer the responsibility/control (Operating Authority) of a work site or a portion of a worksite to a competent person for the purposes of carrying out work on behalf of Harvest.

2. Application and Expectations

The Turnover Agreement is to be used to:

a) Assign / transfer the responsibility of the Operating Authority to another competent person such as a worksite supervisor for the construction, drilling, facilities, well service or environmental groups.
b) When a site is turned over to a competent person, that person will be in charge of the worksite and be responsible to carry out the duties on behalf of Harvest according to the conditions identified in the Turnover Agreement, regulatory requirements, industry standards and the Harvest EHSMS.

c) The Turnover Agreement can be issued for a portion of a worksite or for an entire worksite depending upon the conditions agreed to by the Issuer and Receiver. Work that is to be conducted under the Turnover Agreement may only be performed within the specified area. If the nature of the job requires work to be carried on outside of the specified area or there is a change in scope, all work must be stopped.

d) The worksite supervisor who receives a Turnover Agreement may be responsible for issuing additional safe work agreements as per the Process to Determine Operating Authority and Work Agreement (Worksite Responsibilities) flowchart.

e) Third party owned facility or well that Harvest is contract operating on behalf of the owner: When returning operating authority back to the licensed owner refer to the Contract Wells and Facilities Operating Agreement for details regarding responsibilities.

f) Harvest owned facilities or wells that are contract operated by a third party; operating authority must be acquired and documented from the third party contract operator. Refer to the Contract Wells and Facilities Operating Agreement for further details.

3. Issuing

A Turnover Agreement shall be issued in accordance with the Process to Determine Operating Authority (Worksite Responsibilities) flowchart. The authority of operational sites always resides with the Area Foreman or his designated alternate and does not apply to grass root sites.

The Receiver of a Turnover Agreement is not permitted to turnover the site to another party.

The site must be turned back to the original Issuer of the agreement before another party can be issued a Turnover Agreement for that site.

The Issuer of the agreement in consultation with the Receiver will complete the following sections / boxes of the safe work agreement document:

a) General (date, location, issuer, worksite supervisors, receiver)
b) Scope of Work
c) Assigned Initial Risk Ranking (use risk assessment steps)
d) Type of Safe Work Agreement (cold work/ hot work/ turnover)
e) Worksite Supervisor must (checklist)
f) Supporting Documentation (permits/ forms – reference #'s, documents)
g) Site Conditions / Other Considerations
h) Assigned Final Risk Ranking (use risk assessment steps)
i) Tailgate / Pre-job Meeting Sign off
j) Approval

In cases where it is impractical for the Operating Authority (Issuer) and Receiver to meet, a Turnover Agreement may be issued over the telephone. The Issuer and Receiver must document the conversation in their safe work agreement book and exchange the safe work agreement number. As soon as reasonably practical, the Issuer and Receiver must exchange hard copies. The exchange process can be determined by the affected parties.

4. Site Specific Orientation & Hazard Assessment

When a Turnover Agreement is issued, the Issuer will conduct a site specific orientation & hazard assessment with the Receiver. The Receiver is responsible for conducting the site specific orientation & hazard assessment on the specific worksite for the work that is to be conducted.

The Issuer and Receiver will agree on what hazards and hazard controls are required and who will be responsible to ensure those controls are implemented.

5. Expiry / Suspension / Termination

A Turnover Agreement has a set expiry time/date that is agreed upon by the Issuer and Receiver. The Turnover Agreement can be extended if both the Issuer or their designated alternate and the Receiver agree to the conditions of the extension.

It is the expectation of Harvest that all requirements identified on the Turnover Agreement and agreed to by the Issuer and Receiver will be met. Should any of the conditions not be met or are unable to be met, the agreement will be immediately cancelled and a new agreement will be issued.

6. Job Completion

Upon completion of the work identified on the Turnover Agreement, the Reciever will complete the Hand Back/Job Completion Conditions section of the Turnover Agreement and return the Yellow copy to the Issuer along with any documentation requested on the original agreement.

When working on sites deemed to be “grass roots” the current Operating authority may issue a turn over agreement to the incoming functional group OR return the Operating Authority to the Project Manager. The site is now deemed to be an active operating site.

13.6.2 Cold or Hot Safe Work Agreement

2. Purpose

The purpose of the Cold or Hot Safe Work Agreement is to provide authority to a competent person to proceed with work on a Harvest worksite. To identify and communicate hazards related to the worksite and scope of work. The Issuer will retain responsibility/control of the worksite.

3. Application and Expectations

The safe work agreement is also used to document attendance of a pre-job safety meeting

It is the expectation of Harvest that a cold or hot Safe Work Agreement will be issued according to the Safe Work Agreement flowchart for all work being conducted on a Harvest worksite. It is also expected that all of the conditions agreed to will be met by the person(s) responsible. If the nature of the job requires work to be carried on outside of the specified area or there is a change in scope, all work must be stopped.

4. Issuing

A cold or hot safe work agreement shall be issued in accordance with the Process to Determine Operating Authority (Worksite Responsibilities) flowchart.

A competent Harvest representative that has received the Harvest safe work agreement system training can issue a cold or hot safe work agreement to a competent person.

The Issuer of the safe work agreement in consultation with the Receiver will complete all of the following sections / boxes of the safe work agreement document:

a) General (date, location, issuer, worksite supervisors, receiver)
b) Scope of Work
c) Assigned Initial Risk Ranking (use risk assessment steps)
d) Type of Safe Work Agreement (cold work/ hot work/ turnover)
e) Worksite Supervisor must (checklist)
f) Supporting Documentation (permits/ forms – reference #'s, documents)
g) Site Conditions / Other Considerations
h) Assigned Final Risk Ranking (use risk assessment steps)
i) Tailgate / Pre-job Meeting Sign off
j) Approval

In cases where it is impractical for the Operating Authority (Issuer) and Receiver to meet, a cold or hot safe work agreement may be issued over the telephone. The Issuer and Receiver must document the conversation in their safe work

agreement book and exchange the safe work agreement number. As soon as reasonably practical, the Issuer and Receiver must exchange hard copies. The exchange process can be determined by the affected parties.

5. Site Specific Orientation & Hazard Assessment

When a cold or hot safe work agreement is issued, the Issuer will conduct a site specific orientation & hazard assessment with the Receiver regarding the work that is going to be conducted. The Issuer and Receiver will agree on what hazard controls are required and who will be responsible to ensure those controls are implemented. This is to be documented on the Harvest site specific orientation & hazard assessment form.

The results of the site specific orientation & hazard assessment will be communicated to the work crew during the daily pre-job safety meeting. Any additional hazards identified during the pre-job safety meeting and the hazard controls must be documented on the site specific orientation & hazard assessment document or other available pre-job safety meeting/hazard assessment form.

6. Pre-Job Safety Meeting

A pre-job safety meeting must be conducted prior to the start of work each day including the review of the Safe Work Agreement and all people that are in attendance must sign off. The discussion at the pre-job safety meeting must include the scope of work, results of the site specific orientation & hazard assessment, hot work requirements and any conditions as identified on the Safe Work Agreement.

The pre-job safety meeting and any additional hazards identified must be documented on the Harvest site specific orientation & hazard assessment form or other available pre-job safety meeting/hazard assessment forms.

7. Expiry / Suspension / Termination / Extension / Duration

A cold safe work agreement has a set expiry time/date that is agreed upon by the Issuer and Receiver. The original expiry time/date of the cold safe work agreement cannot be longer than the schedule shift rotation of the Issuer. A completed cold safe work agreement can be extended if both the Issuer or their designated alternate and the Receiver agree to the conditions of the extension. Hot safe work agreements shall only be issued for each specific hot work task and shall not exceed one day.

If the scope of work changes or if there is an emergency affecting the area, the safe work agreement will be suspended until the Issuer and Receiver review the safe work agreement and revise it accordingly or issue a new safe work agreement.

A cold or hot safe work agreement will be terminated if any of the conditions on the safe work agreement are not met and/or the Issuer's shift is complete.

8. Job Completion

Upon completion of the work identified on the cold or hot safe work agreement, the Receiver will complete the Hand Back/Job Completion Conditions section and return the Yellow copy to the Issuer along with any documentation requested on the original agreement.

9. Routine Operations – Harvest Personnel

Cold safe work agreements are not required for the following tasks:

a) Where the atmosphere will remain normal for human respiration.
b) A worker taking readings
c) A worker making external adjustments to the process (changing valve positions, equipment settings etc.)
d) Daily, weekly and monthly housekeeping activities
e) Harvest personnel working in their respective shops
f) A worker taking other visitors on a tour of a facility for the sole purpose of observation

Additions may be made to the above list after a documented site specific orientation & hazard assessment of the work is completed and reviewed by a team consisting of the Area Foreman in charge, the Area Superintendent, the Operations Manager, and the EHS Manager and at least one Representative of the affected workers.

13.6.3 Term Safe Work Agreement

1. Purpose

To provide environment, health and safety expectations and authority to companies that conduct what is deemed to be low risk work when controls have been implemented as specified in the Term Safe Work Agreement: e.g. repetitive or routine work on behalf of Harvest.

2. Application and Expectations

The Term Safe Work Agreement is issued for work activities when it is impractical to issue a safe work agreement each time the task is performed. A Term Safe Work Agreement is used to identify the potential hazards that may be encountered and requirements to be followed while on a Harvest worksite.

It is the expectation of Harvest and the applicable safety regulations that the person/company performing the job under the Term Safe Work Agreement will conduct and document a site specific orientation & hazard assessment prior to carrying out the work. If the company does not have a specific orientation & hazard assessment form a sample specific orientation & hazard assessment form is provided in the Forms section.

The Harvest representative will review the contents of the Term Safe Work Agreement with the Receiver along with the Receivers work procedures, specific orientation & hazard assessment and JSAs. Both the Issuer and Receiver will sign the agreement. The agreement and applicable documents will be put on file at the field office. A copy of the Term Safe Work Agreement will be given to the Receiver.

A copy of the Term Safe Work Agreement must be readily available on the worksite at all times for review by all affected parties.

The following is a list of activities which a Term Safe Work Agreement may be issued for:

a) Product Hauling
b) Road / Lease Maintenance
c) Vegetation Management
d) Metering / Proving Calibration
e) Line Locating Surface (strict conditions as identified in the specific Term Agreement)

3. Authorization

A Term Safe Work Agreement between Harvest and the Contract Company must be signed and approved by:

- Harvest Area Superintendent
- Harvest Area Production Foreman
- Harvest Area Safety Advisor
- Authorized representative of the contracting company

4. Expiry / Suspension / Termination / Duration

Term Safe Work Agreements can be issued for a maximum of 12 months.

A Term Safe Work Agreement may be suspended or terminated by Harvest at any time the agreement is in force. If the agreement is suspended the Issuer, the Harvest Representative who initiated the suspension and Receiver must review the suspension prior to work proceeding and a new Term Safe Work Agreement must be completed.

13.6.4 Additional Supporting Documentation

Certain work activities may require the completion of additional documentation to support the Term Safe Work Agreement. The Area Safety Advisor will assist in directing the Issuer/ Receiver as to what type of additional documentation may be required.

1. Confined Space Entry Permit

The Confined Space Entry Permit outlines additional precautions required for entry into confined spaces. The Confined Space Entry Permit and corresponding Decision Chart provide guidance on identifying confined spaces at a worksite and specify entry requirements. Additional information on conducting a confined space entry is included in the Confined Space Entry Code of Practice (COP). Confined Space Entry Permit booklets are available to workers responsible for issuing Confined Space Entry Permits. A Confined Space Entry Permit is also provided in the Forms section for reference.

2. Ground Disturbance Checklist

The Ground Disturbance Checklist is to be completed whenever the proposed work involves a ground disturbance. The purpose of the Ground Disturbance Checklist is to ensure all reasonable precautions have been taken to eliminate possible subsurface facility strikes and ensure the safety of all personnel involved in the ground disturbance. Additional information on conducting a ground disturbance is included in the Ground Disturbance COP. Ground Disturbance Checklist booklets are available to workers responsible for issuing Ground Disturbance Checklists. A Ground Disturbance Checklist form is also provided in the Forms section for reference.

3. Working in Proximity to Overhead Power Lines Form

The Working in Proximity to Overhead Power Lines Form must be completed when the proposed work involves working or operating equipment in the vicinity of an overhead power line. The Working in Proximity to Overhead Power Lines Form assists workers in identifying hazards, safe limits of approach and procedures for performing work safely. Additional information for working safely in the vicinity of overhead power lines is included in the Overhead Power Lines Safe Operating Procedures (SOP). A Working in Proximity to Overhead Power Lines Form is provided in the Forms section.

4. Lockout - Tagout Record Sheet

When the proposed work requires isolation or blocking of energy sources to protect workers from a potential, unexpected release of hazardous energy, a Lockout - Tagout Record Sheet must be completed. Additional information on

identifying possible energy sources and control points is contained in the Energy Isolation; Lockout - Tagout (Zero Energy) and a Lockout - Tagout Record Sheet is contained in the Forms section.

5. Enform - Electronic General Safety Orientation (eGSO)

All employees, contractors, and sub-contractors conducting work at a Harvest worksite must complete an Enform - eGSO prior to commencing work.

The Enform – eGSO is available online through Enform (www.enform.ca).

Note: The HOC Field Safety Orientation can be used for temporary coverage for an individual that cannot provide proof of completing the Enform – eGSO. A Harvest Field Safety Orientation must be conducted by a competent Harvest representative. This orientation is only valid for the duration of the scope of work determined by the Worksite Supervisor. Copies of the Harvest Field Safety Orientation must be retained in the field office or project file for future reference.

6. Fall Protection Plan

In the event the job requires working at heights as defined in the Working At Heights SOP.

7. Critical Lift Plan

When conducting work that involves lifting devices such as cranes, and hoists rated at 2200 kilograms or more, a critical lift plan will need to be developed as contained in the Working At Heights SOP.

8. Job Safety Analysis (JSA)

JSAs are conducted to identify hazards, assess risk and assign hazard controls for critical tasks and new/unusual work.

13.7 Evaluation

Safe work agreements are to be evaluated on a regular basis as part of the Harvest inspection process. The goal of the evaluation is to determine the areas for improvement regarding the Safe Work Agreement System.

Safe work agreement evaluations will be documented using the Safe Work Agreement System Evaluation Record contained in the Forms Section.

13.8 Record Keeping

Safe Work Agreement System documentation shall be maintained as follows:

a)	Turnover Safe Work Agreement	2 Years
b)	Cold Safe Work Agreement	2 Years
c)	Hot Safe Work Agreement	2 Years
d)	Term Safe Work Agreements	2 Years – after expiry date
e)	Site Specific Orientation & Hazard Assessment	2 Years
f)	Confined Space Entry Permit	2 Years
g)	Ground Disturbance Checklist	2 Years
h)	Evaluation Records	2 Years

13.9 Glossary

Classified Area:

a) Class I - locations are those in which flammable gases or vapours are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

b) Zone 0 - explosive gas atmospheres are present continuously or for long periods of time.

c) Zone 1 - explosive gas atmospheres are likely to occur in normal operations; or

- may exist frequently because of maintenance, repair, or
- leakage; or
- is adjacent to a Class I, Zone 0 area from which explosive gas atmospheres may be communicated.

d) Zone 2 - explosive gas atmospheres are not likely to occur in normal operations, or

- will exist for only a short time; or
- those locations which flammable volatile liquids, flammable gases or vapors are handled, processed, or used, but in which they are normally confined within closed containers or systems from which they can escape only as a result of accidental rupture or abnormal operation of that equipment; or
- explosive gases are normally prevented by adequate ventilation, but which may occur due to failure or abnormal operation of the ventilation system; or

- is adjacent a Class I, Zone 1 area from which explosive gases could be communicated, unless such communication is prevented by positive pressure ventilation, and safeguards against ventilation failure are provided.

NOTE: See Section 3.4.14 – 9, Hazardous Locations Classification Diagrams.

Cold Safe Work Agreement: A written agreement between the Operating Authority and the Performing Authority (workers) that requires consideration of all recognized potential hazards and outlines the conditions under which the work can be conducted with minimum risk. Agreement must be established between both parties.

Competent Worker: "Competent", in relation to a worker means adequately qualified, suitably trained and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Fire Watch: A person who's primary role is that of monitoring the work in progress in order to effect emergency response in case of fire.

Flammable Atmosphere: Any atmosphere that contains more than 10% of the Lower Explosive Limit (LEL) of a flammable gas or vapour is considered potentially flammable.

Hot Safe Work Agreement: An Agreement that incorporates all the considerations of the Cold Safe Work Agreement as well as the identification of all recognized ignition sources and the precautions necessary to minimize the risk of fire or explosion.

Ignition Source: Any or all of the following could be an ignition source: cutting, welding, burning, riveting, drilling, grinding, chipping, non-classified electrical equipment, combustion engines, or any other work where flame is used or significant sparks are produced.

Immediately Dangerous to Life and Health (IDLH): Any toxic or oxygen deficient atmosphere that presents immediate danger to health as defined by the applicable jurisdiction (refer to oxygen enriched atmosphere and toxic atmosphere for more information).

LEL (Lower Explosive Limit): The lowest concentration of a combustible gas in air, which will result in an explosion, if ignited. For example, methane has a LEL of 5.3%. Therefore, a mixture of 5.3% methane in air will explode, if an ignition source is introduced.

Operator Preparation: Work required to prepare the site such as isolation of equipment, depressurization, purging or venting, or anything else that requires an Operators specific knowledge of that facility or task.

Note: The Performing Authority may do the necessary preparation work, if they have specific knowledge of that facility or task.

Operating Authority (Issuer): The person having immediate control and responsibility for the operations affected by the specific Safe Work Agreement.

Oxygen Deficient Atmosphere: Any atmosphere where the oxygen content is less than 19.5% by volume.

Oxygen Enriched Atmosphere: Any atmosphere where the oxygen content exceeds 23% by volume.

Performing Authority: The person performing the work, or in direct charge of the work being performed. Common titles are: Crew leader, Job foreman, Crafts person, Worker, etc.

Personal Monitor: Four gas monitor used to monitor ambient air for contaminants. Heads must include H_2S, LEL and O_2

Personal Protective Equipment (PPE): Equipment or clothing worn by a worker for protection against health or safety hazards associated with the working conditions at a worksite.

Portable Testing Equipment: Equipment specifically designed for testing the atmosphere for flammability, toxicity, oxygen content, or particulate contaminants.

Risk Assessment: As defined by the Risk Matrix. Low, Medium and Unacceptable

Safety Watch: A person whose role is strictly that of monitoring the work in progress in order to immediately alert workers and effect a rescue, should hazardous conditions develop.

Shift: The scheduled days on to the scheduled days off; e.g. Monday to Friday

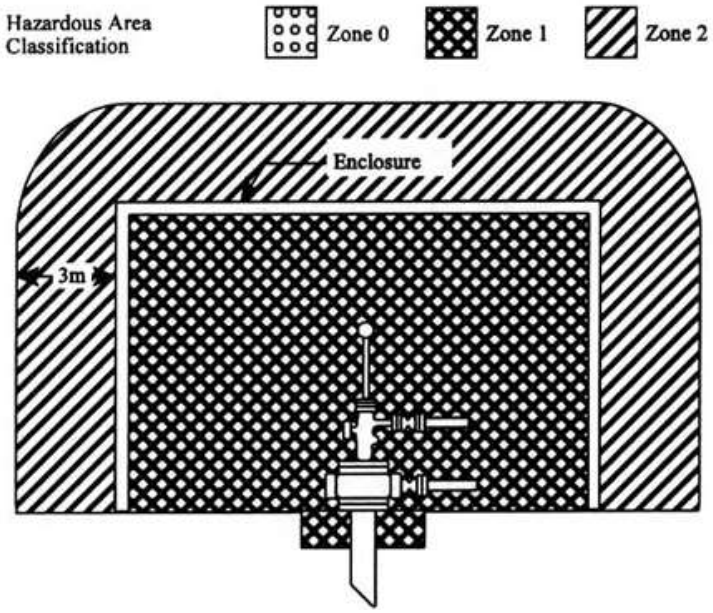
Site Hazard Identification, Assessment and Control: Site Hazard Identification, Assessment & Control is a documented verification that all recognized Site Hazards are Identified, Assessed and appropriate Controls implemented to minimize the risk to personnel at the worksite. This must be done prior to start of any work activity.

Term Safe Work Agreement: A written agreement between Harvest Operations Corp., and the Contracting Party. It identifies the potential hazards that may be encountered while on a Harvest worksite and is issued to allow work where it is impractical to issue a Safe Work Agreement / Hazard Assessment each time the task is performed.

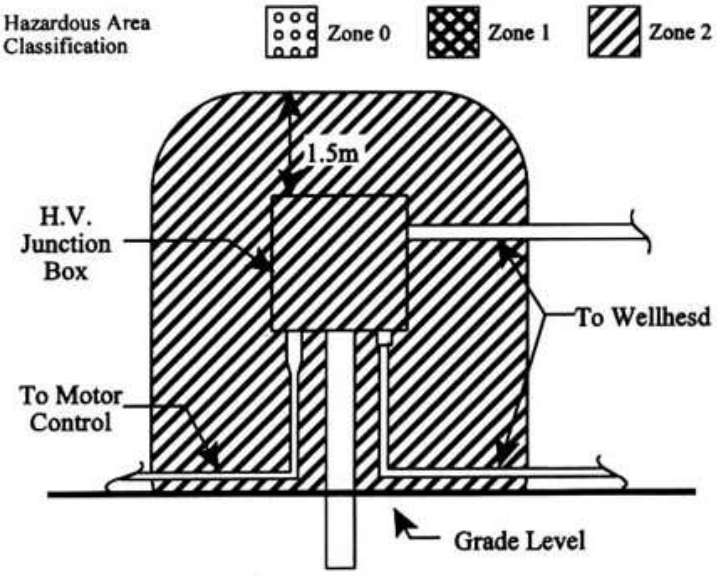
Toxic Atmosphere: An atmosphere that contains greater than the OEL (Occupational Exposure Limit) or TLV (Threshold Limit Value) of a gas, vapor, or particulate according to values established by the Provincial Chemical Hazards Regulations.

13.10 Hazardous Locations Classification Diagrams

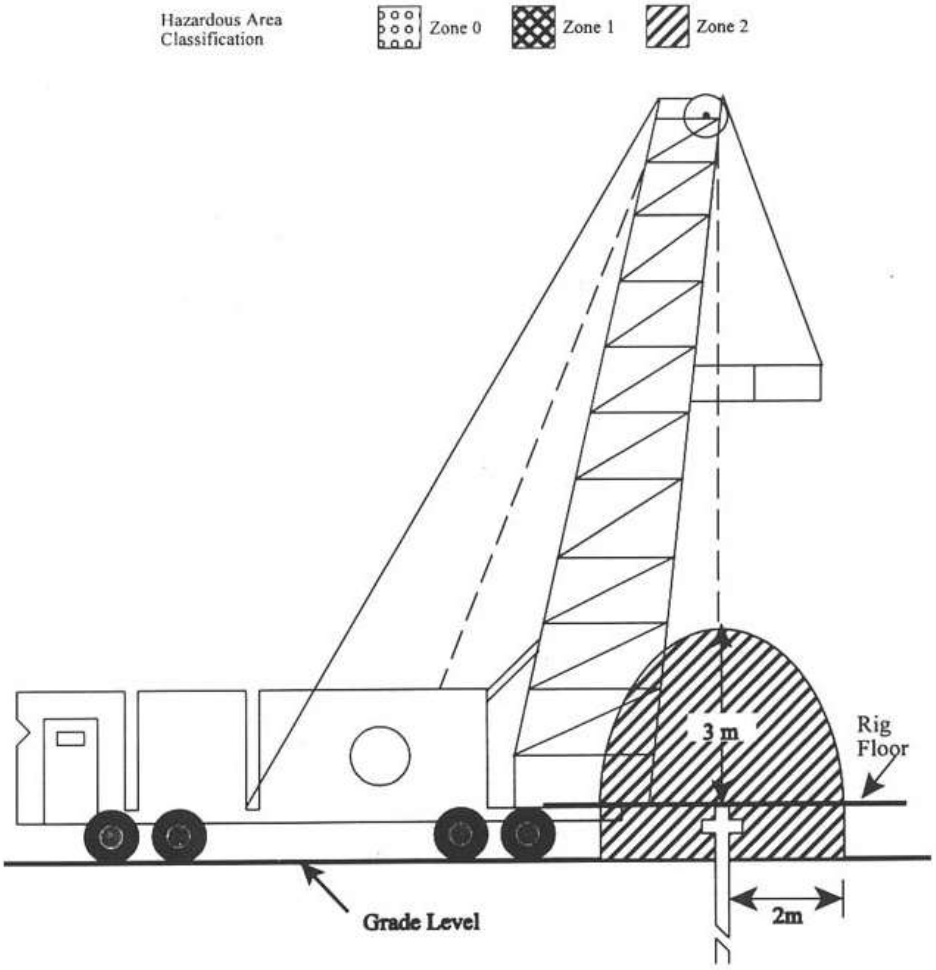
Wellhead in an Enclosure



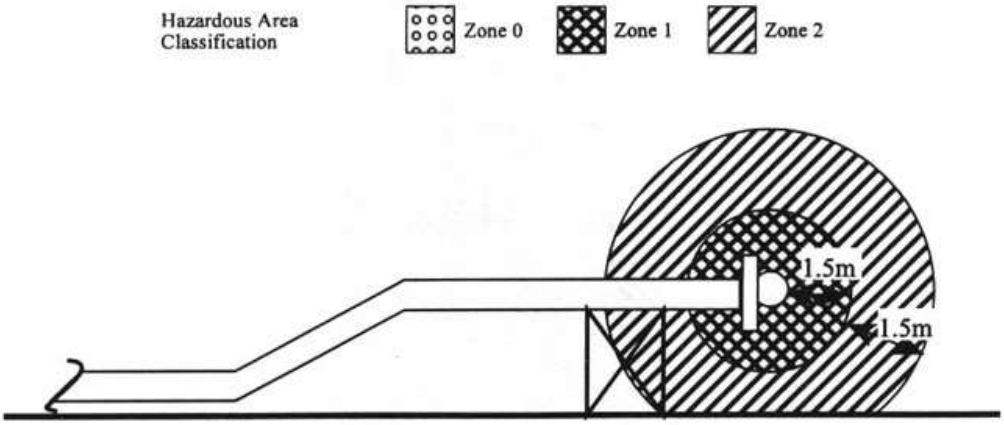
Junction Box for Electric Submersible Pumps
(Adequately ventilated area)



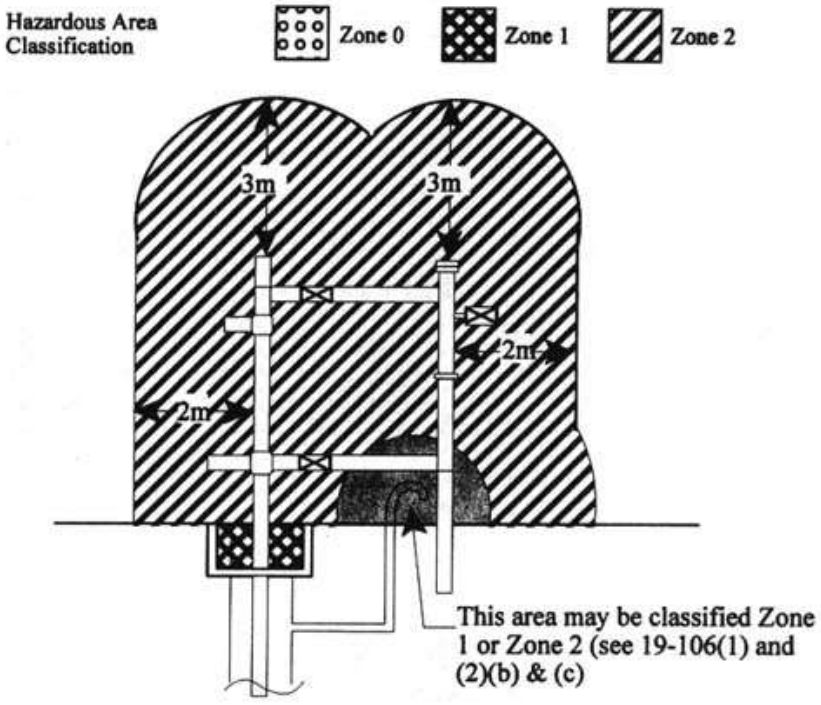
Service Rig
(Sub-Structure and Rig Floor are not Enclosed)



Tool Launching or Receiving Installation
(Adequately ventilated)



Typical Wellhead



WORKING ALONE

14.0 WORKING ALONE

14.1 Introduction

Employers are required to assess the workplace and take preventative measures that eliminate or minimize risks when a worker is required to work alone or in isolation under conditions or circumstances where assistance is not readily available.

If the worker might not be able to secure assistance in the event of injury or other misfortune, the employer must develop and implement a written procedure for checking the well being of the worker. An employer shall take all reasonably practicable steps to eliminate or reduce the risks associated with the conditions and circumstances of the worker's work or the isolation of the worksite.

14.2 Administration

The Worksite Supervisor is responsible for ensuring that:

a) The risks arising from work and circumstances are identified.
b) A written procedure for checking in and out is implemented based on the risks associated with the job.
c) The procedure and system for checking a worker's well being is reviewed at least annually or more frequently if there is a change in work arrangements.
d) The site establishes minimum training or experience, or other standards of competency associated with the identified hazards.
e) An effective communications system is employed based on the hazards identified.

14.3 Site Specific Orientation & Hazard Assessment

In consultation with the worker's involved, identify the hazards arising from the conditions and circumstances of the worker's work or the isolated place of employment. An employer shall take all reasonably practicable steps to eliminate or reduce the risks identified. The following process should be utilized to identify and assess the hazards and develop appropriate controls to reduce the risks.

a) Developing a task list for specified work locations.
b) Risk ranking the tasks using the risk matrix.
c) Developing appropriate controls such as written procedures for high-risk tasks.

14.4 Procedures

The employer, in consultation with the worker's involved, must develop and maintain a written procedure for checking the well being of a worker assigned to work alone or in isolation. The procedure shall include as a minimum:

a) The time interval between checks and the procedure to follow in case the worker cannot be contacted; including provisions for emergency rescue (High-risk activities require shorter time intervals between checks).
b) A check at the end of the work shift.
c) A process to establish contact with the worker at predetermined intervals. (Documentation of these results is a must in British Columbia and should be considered in Alberta & Saskatchewan).

14.5 Communication

May include any of the following:

a) Regular contact by employer with the worker working alone or at an isolated place of employment.
b) An effective method of communicating with a worker such as radio, telephone or cellular phone.
c) Any other means that provides effective communication in view of the risk involved.
d) Limitations on, or prohibitions of, specified activities/tasks.

14.6 Training

A worker required to work in the circumstances or conditions described in this COP and any person assigned to check on the worker must be trained in the written procedure for checking the workers well being.

A worker required to work in the circumstances described in this COP must be made aware of the hazards identified and trained in proper procedures and practices to reduce the potential risks.

14.7 Applicable Regulations

	Alberta	British Columbia	Saskatchewan
WORKING ALONE OR IN ISOLATION	OH&S ACT GENERAL SAFETY REG. #14.1	OH&S – WCB GENERAL SAFETY REG. #4.21	OH&S ACT GENERAL SAFETY REG. #35

14.8 Applicable Terms or Definitions

Competency Training: means certification in a field if it exists, other aspects of competency include on the job supervised training, records of training, ongoing re-certification formal/non-formal, observation of the worker. Certification is only the beginning and does not reduce the employer's responsibility to train and confirm competence.

Site Specific Orientation & Hazard Assessment: a look at the workplace to identify existing hazards for worker's working alone, utilizing the standard Risk Assessment tool. Identification of the hazards and determine the probability and severity of an accident.

Hazard: means a thing or condition that may expose a person to a risk of injury or occupational disease. Some kind of physical threat (usually) to the well-being of a person, unchanging and ever present unless the physical environment changes or is changed.

Must: is used to refer to mandatory requirements.

Practicably: means that which is reasonably capable of being done.

Risk: is the potential of loss (an undesirable outcome, however not necessarily so) resulting from a given action, activity and/or inaction, foreseen or unforeseen. The notion implies that a choice having an influence on the outcome sometimes exists (or existed). Potential losses themselves may also be called "risks" without any indication of cause. Any human endeavour carries some risk, but some are much riskier than others.

To Work Alone: means to work at a worksite as the only worker at that worksite, where assistance is not readily available if required.

Appendix A Example of Check-in/Check-out Procedures for Working Alone or In Isolation

There must be a process in place to verify that workers have arrived at the beginning of their shift and are accounted for when leaving the last site at the end of the shift. Specific check-in/check-out times should be established for each site/area.

Note: All personnel must be accounted for before everyone leaves the workplace at the end of the shift. If someone has to work late then Task Specific type Procedures should be implemented.

For “High Risk” tasks, as identified by Hazard Assessments / Risk Analysis, the time frame will need to match the risk (e.g. – for starting an Iron Horse Compressor, the check-in would be immediately before starting the task and re-check or check-out would be 15 – 30 minutes maximum).

Note:

1. Where backup is required; personnel shall have a backup person present and at the ready. They must establish communications with another area worker (third worker), indicating their situation and intentions. The backup person with radio contact shall maintain the communication link until work is completed and area proved to be safe.
2. During times when the third area worker is unavailable a communication link must be established through answering service or telephone with the supervisor/designate or a days off worker. The contacted person shall then establish radio communication with the field personnel before the work is allowed to commence. The radio communication link shall be maintained until the work is completed and area proved to be safe.
3. Personnel and Answering Service will receive an updated list of all personnel in the area on a regular basis.

Appendix B Example of Check-in/Check-out Procedures for Task Specific

1. Worker arrives on site and initiates communication with another area worker or answering service. Communication must establish the situation; their intentions and set a check-in time when work would be completed (e.g. 15 – 30 minutes maximum time).

   a) Person receiving call (may be answering service) must note activities, monitor time elapsed and ensure call back to individual conducting the task.

   Note: This person will also be responsible for activating emergency response if required.

   b) If Worker fails to check-in at end of task or predetermined time, Person monitoring individual (may be answering service) will attempt to contact the worker using all means of communication.
   c) If there is no response from the Worker, the Person will notify another area worker or the immediate supervisor/designate before proceeding to the site. (If it is answering service, they will contact another area worker and/or supervisor/designate).
   d) The Response Person will go directly to the site where the individual was conducting the task.
   e) The other area worker and/or supervisor/designate will stay in communication with the Response Person until individual not responding is found.

2. Worker has completed the task and is ready to leave the site. The other area worker or answering service is called and informed that the task is complete and the Worker is leaving the site.

Appendix C Example Call-out Procedure (After Hours)

1. Answering service receives call from facility; on-call operator is notified by answering service.
2. Operator calls answering service as they are leaving their residence to inform them of their departure and to give an estimated time of arrival at the facility.
3. Operator/ Answering Service/ Response Person:

    a) Operator arrives on site and calls the answering service to verify that they are onsite. If Operator fails to call into answering service steps (b) & (c) applies.
    b) Answering service monitors time elapsed and if Operator fails to call in within the estimated time of arrival, the answering service will attempt to contact the Operator using all means of communication.
    c) If there is no response from the Operator, the answering service will call the designated Response Person and dispatch them to the site while following the same procedure as written in step 2 and 3(b).
    d) The senior operator and/or the area supervisor will also be notified of the situation by the answering service at the time that the Response Person has been dispatched.
    e) The Response Person will go first to the site, and if the Operator is not at the site, the Response Person will then take the route most likely taken by the Operator from their residence to the site.

4. Operator evaluates situation at site and determines if backup is required. If backup is required, Operator stays on site in a safe area until backup is dispatched and has arrived on site. If no backup is required, Operator calls answering service and informs them of time required to correct the problem and call back in. (There will be a maximum time of 1 hour between calls to the answering service while the operator is on site).

    Notes:

    - Where backup is required; personnel shall have a backup person present and at the ready. They must establish communications with another area worker (third worker), indicating their situation and intentions. The backup person with radio contact shall maintain the communication link until work is completed and area proved to be safe.
    - During times when the third area worker is unavailable a communication link must be established through answering service or telephone with the supervisor/designate or a days off worker. The contacted person shall then establish radio communication with the field personnel before the work is allowed to commence. The radio communication link shall be maintained until the work is completed and area proved to be safe.

5. When the Operator has corrected the problem and is ready to leave the site:

   a) Answering service is called and informed that the facility is back in operation and the Operator is leaving the site.
   b) Operator will then give an estimated time of return to their residence.
   c) Answering service monitors time elapsed and if Operator fails to call in within the estimated time of arrival, the answering service will attempt to contact the Operator using all means of communication.
   d) If there is no response from the Operator, the answering service will call the designated Response Person and dispatch them to the site while following the same procedure as written in step 2 and 3(b).
   e) The senior operator and/or the area supervisor will also be notified of the situation by the answering service at the time that the Response Person has been dispatched.
   f) The Response Person will go first to the Operators residence, and if the Operator is not at their residence, the Response Person will then take the route most likely taken by the Operator from the site to their residence.

Note: Answering Service will receive an updated list of all personnel on a regular basis.

GENERAL SAFETY

1.0 GENERAL SAFETY

1.1 Introduction

Standard safety rules let workers know what is expected of them on company worksites. Safety rules are written to protect workers, contractors and visitors from known hazards and to ensure the company meets regulatory requirements. In addition to these General Rules Harvest has Policies, Codes of Practice (COP), Procedures and Guidelines which offer greater detail.

1.2 Warning Signs

As a warning to workers and the public, certain areas must be signed to indicate hazards or restrictions. All signs should be made of durable material and be large enough to be easily read.

At a lease entrance to a drilling, completions, or workover site:

a) No Unauthorized Personnel
b) Report to Supervisor or Office
c) Hard Hat Area
d) Danger H2S or Flammable (in accordance with provincial regulations)
e) Signs specific to the jobs being performed

At a lease entrance to a production facility or well site:

a) Company name, facility name and legal description
b) Harvest 24 hr. emergency Phone # 1-800-760-2826
c) No Unauthorized Personnel
d) Signs specific to the site hazards such as:

- H_2S
- Hearing Protection Required
- Hard Hat Area

Temporary signs, barriers or barricades that are required for specific work activities are to be supplied and erected appropriately and maintained while the work is being carried out. The site representative will, in consultation with the contractor representative, determine which signs are required. Contract companies working for Harvest are expected to supply signs, which are specific to their operation. Some examples include:

a) Danger – Pipeline Crossing
b) Danger – Overhead Work
c) Danger – Open Trench (Excavation)
d) Danger – Overhead Lines
e) Danger – High Pressure Lines
f) Danger – Radiation

g) Turn Off 2-Way Radios, Perforating in Process

1.3 Firearms, Weapons or Explosives

Firearms (other than flare guns required onsite), weapons, or explosives are not permitted at the worksite or in company vehicles unless authorized in writing by management for work related reasons. Where firearms are deemed to be required for protection (e.g., bear or wolf country), expressed written permission must be obtained from functional group manager and VP.

Personnel granted this permission must obey all the laws (Federal and Provincial) governing firearms handling, storage and use.

Specifically, there will be no tolerance for:

a) handguns (other than approved flare pistols)
b) recreational use of firearms
c) careless use or storage of firearms
d) violation of Provincial or Federal firearms licensing, training, permitting or safe storage regulations
e) violation of Provincial fish and wildlife regulations
f) damage to Harvest's reputation or stakeholder relations resulting from firearm use

1.4 Horseplay

Horseplay and practical jokes can result in serious injury, therefore horseplay, practical jokes, or any activity that interferes with another worker is strictly forbidden.

1.5 Personal Protective Equipment (PPE)

Harvest requires that all protective and safety equipment necessary for its workers to perform work safely will be CSA approved or equivalent. All visitors to Harvest facilities are expected to comply with the rules and procedures, prevailing at the worksite, for the use of PPE. The requirement to use PPE is a legal obligation on all personnel.

1.6 Clothing

Workers must wear outer clothing appropriate to the task needs, operating conditions and weather factors. All workers shall be fully clothed in long sleeved shirt, long pants, and acceptable footwear while on a Harvest worksite. All outwear must be kept clean, and cleaned according to manufacturer's recommendations in order to provide adequate protection as intended. The following identifies what clothing may be required:

a) For readily absorbable chemical or other hazardous materials rubber suits or aprons or combinations of both should be worn. Refer to the SDS
b) Chainsaw pants and boots are required for all workers working with chainsaws

c) High visibility safety vests must be worn when working with traffic or around multiple vehicles or mobile equipment
d) Personnel must wear fire retardant outerwear on all live operating sites. Exceptions would be:

- welders who typically wear clothing that is spark resistant
- construction that is grass roots (not on a live operating site)
- delivery and supply persons who will not be working on the site
- when wearing a fully encapsulated suit such as for catalytic bead removal
- visitors, where there are no abnormal operating conditions

e) Clothing made from acrylic, acetate, polyesters, nylon and polycotton blends are not allowed on live operating sites as they tend to melt or sustain flame when exposed to heat or fire
f) Ensure all clothing purchased for outerwear is Fire Retardant

For further details on clothing standards refer to Harvest Fire Resistant Clothing Guideline.

1.7 Foot Protection

CSA approved safety footwear must be worn at all times on company operated properties, except for offices and other areas exempted in writing by the site. Footwear must meet the following minimum requirements:

a) CSA approved boots with grade 1 certification for toe protection. This footwear is easily recognized by the presence of a green CSA triangle or rectangle or equivalent certification by NIOSH or ANSI.
b) Footwear must be constructed of substantial material such as leather or other non-absorbent material and must have a minimum height of 150mm (6”) in order to minimize ankle injuries. Footwear must have a protruding heel of 12mm (1/2”) or better to prevent injuries that occur from slippage of soles on metal ladder rungs.
c) Soles must be designed for oil, and slip resistance. Sole must be free of cleats, hobnails, or other material that may cause a spark
d) Rubber boots should be used for handling hazardous materials or when working in water or deep mud

1.8 Hand Protection

Gloves protect a worker’s hands from cuts, bruises, cold, heat, and chemical burns. As there are various styles; each designed for a specific type of job; workers must wear the correct style for the job. The following general list will guide the worker in the selection of the correct style:

a) Nitrile or neoprene gloves are for handling most corrosive or toxic chemicals. SDS should be consulted for safe handling methods. If still not clear, ask your supervisor

b) Rubberized canvas gloves are for wet mechanical jobs or where contact with some acid may be encountered
c) Electrician's rubber gloves are for use on electrical equipment only, with leather protectors worn over them
d) Welding gloves are for use on all burning and welding operations
e) Thermally insulated gloves are for use where extreme heat or cold is encountered
f) Gloves worn around moving machinery must be tight fitting

1.9 Head Protection

Non-conductive hardhats shall be worn within the work area and on any jobs where there is a danger of injury to the worker's head. A hardhat must never be worn without a properly adjusted suspension. The industry standard for hardhat life is 5 years of use, at which time they should be replaced.

Where it is not possible or impractical to wear a hardhat; an alternative such as a bump cap may be utilized if a hazard assessment is conducted and recorded.

Helmets are mandatory when an Off-Highway Vehicle is used for work, unless equipped with rollover protection and a seat belt, as regulated by OH&S.

Where you are carrying out work activity upon arrival at the site, you may continue to wear the approved helmet provided that the work does not expose the worker to any potential contact with exposed energized electrical sources, and the tasks performed at the work site are of limited duration.

2.0 Safe Work Practices

2.1 Cranes & Mobile Lifting Equipment

Supervisors shall ensure that all lifting devices, cranes, hoists, and rigging are safe to use, meet manufacturer's specifications and are operated by competent workers. When using overhead cranes or hoists, the following applies:

a) Operators must visually inspect the crane or hoist before use. Inspection should include, but is not limited to:

- Hooks and safety latches
- Ropes, chains, slings for wear or damage (stretching, fraying)
- That all motions are functioning properly
- Upper & lower limit devices operable
- Unusual noise or rough, jerky operation
- Emergency / end stops operable

b) Maintenance and inspection frequency of cranes, hoists, and rigging must be developed and applied in accordance with the manufacturer's specifications
c) Cranes and Hoists must be operated in accordance with a validated JSA
d) Any equipment found to defective must not be used and is to be reported to the supervisor. Structural repairs or modifications may be made only under the direction and control of a professional engineer, and certified by that same engineer
e) Hoisting devices shall not be loaded beyond the rated limit
f) Tag lines must be used to control loads
g) No one should stand, work, or walk under a load
h) Suspended loads must not be left unattended
i) Only one trained worker shall be designated to give signals to the crane operator. The operator in turn should respond only to that worker, except for the emergency stop signal, which can be given by anyone
j) A certified individual or agency must inspect cranes or hoists annually

2.2 NON- Intrinsically Safe Devices

The use of non-intrinsic devices e.g. cell phones, cameras, lap-tops, mini-laptops, flashlights and pagers, are not allowed within the identified hazardous areas of all Harvest worksites. To that end a non-intrinsic device may not be used within 7.5m of a well head, process vessels, process piping, pipelines, production tanks and or storage vessels.

Electrical equipment that is to be used in classified buildings or hazardous areas must be rated for the hazard that may be present, or be rated for the area in which it will be utilized. Where this is not attainable, acceptable engineering practices must be applied. This can include; removal of the hazard, removal of the equipment or establishment of a safe work procedure for the implementation and/or use of this equipment as defined by the Canadian Electrical Code, Part I, 19 Edition and the Occupational Health and Safety Code.

The implementation and/or use of non-intrinsic electrical equipment within a hazardous area may be achieved by the use of continuous monitors checking for the Lower Explosive Limit (LEL), Oxygen (02), Hydrogen Sulfide (H_2S) or any other hazard that may be present. This procedure must include checking for LEL prior to electrically energizing the non-intrinsic battery powered or electrically powered equipment. This procedure must also include continuous monitoring while the battery-powered/electrical equipment is in use within the hazardous rated area and under the specific directions of a hot safe work agreement.

Operations personnel shall establish a documented procedure if non-intrinsic equipment is to be utilized through a pre job hazard assessment. All third party work must be performed under the issue of a hot safe work agreement defining the hazards and procedures for the energizing of non-intrinsic electrical/battery powered equipment.

2.3 Overhead Work

When working overhead, the area below shall be roped off or other equivalent measures taken (e.g., barricades, signs, etc.) to protect other workers from potential falling objects. Signs reading “Danger – Overhead Work” should be conspicuously posted. If conditions justify, a safety watch person shall be stationed, within a distance of voice communication, to warn persons in the area.

2.4 Sampling - Gas and Liquid

Appropriate PPE must be worn at all times when sampling. Special PPE equipment such as chemical goggles, rubber gloves, chemical suits, respiratory protection etc., must be worn when sampling acids, corrosives, caustics, volatile hydrocarbon liquids or other toxic chemicals. Wash all such equipment in water and/or approved neutralizers immediately after use.

Where conditions may subject a worker to oxygen deficient or toxic atmosphere, breathing apparatus shall be worn.

When taking a sample, the following must be considered:

a) Use only approved sample containers (The approved sample container must be checked to ensure that it is designed for the gas or liquid being handled and has a pressure rating sufficient to handle the working pressure)
b) All sampling lines must be pre-tested
c) All sampling containers must be properly labelled
d) Exercise caution to avoid spilling liquids. Clean up any spills immediately.
e) LPG causes serious frost burns, and care must be taken to direct the vapour from the sample point away from personnel
f) Specific precautions must be taken when sampling propane and butane in special sampling bombs (cylinders). These must not be completely filled with liquid, as they are not designed to withstand the extreme pressures of liquid expansion
g) When sampling is to be done at a bleed valve, the valve must be opened slowly. A blockage could blow loose when the valve is opened suddenly and could result in a sudden release of a large amount of product and energy. This could result in fire and/or injury due to the escape of gas and/or liquid at high pressure
h) All sampling must be conducted under a documented procedure. If sampling is to be conducted by a third party, an appropriate safe work agreement or term agreement must be issued and strictly adhered to.

2.5 Vehicle Operation

Vehicle operation is the highest risk activity undertaken in the upstream oil and gas industry. Therefore whenever vehicles of any kind are being operated for Harvest’s business activities, Harvest expects all employees and contractors to:

a) Drive responsibly and always within all provincial regulations
b) Drive courteously, as representative of your employer

c) Obtain and maintain current defensive driver training when necessary
d) Maintain a valid Driver's License, and submit abstracts to Harvest upon request
e) Ensure that vehicles are maintained according to manufacturer's specifications
f) Ensure that vehicles are adequately equipped for foreseeable emergency situations
g) Regularly inspect vehicle for condition, maintenance and equipment
h) Report any accidents to your supervisor and appropriate Harvest EHS Advisor

Refer to Incident Reporting and Investigation section for additional information on reporting vehicle accidents.

2.5.1 Electronic Communication Device Use

In order to reduce the risk of vehicle incidents related to the use of electronic communication devices, the following best practices are mandatory and must be applied.

a) Avoid making or receiving telephone calls while driving regardless of the equipment available. Calls should go to voicemail and the driver should pull over when it is safe to do so or wait until they reach their destination and return calls at that point
b) If it is essential at times to make and receive calls while driving, use the electronic devices hands free functions (e.g., auto answer, voice dialing, one touch answering, etc.) to reduce the amount of distractions
c) Text messaging, emailing and keyboarding is not allowed while driving.
d) Do not take notes while driving

2.5.2 Classified Areas

Under normal operating conditions, classified areas generally extend 3m (10ft) around wellheads, process buildings, process equipment etc. Vehicles must not to be operated within 7.5m of wellheads, process vessels, process piping, production storage tanks, storage vessels and other such classified areas unless a hot work agreement is issued.

All diesel engines must be equipped with an operational automatic positive air shut off. The device must be tested in accordance with the manufacturer's specifications.

SAFE OPERATING PROCEDURES

3.4 SAFE OPERATING PROCEDURES

*Sections currently under development.

ALL-TERRAIN VEHICLES (ATVs)

1.0 ALL-TERRAIN VEHICLES (ATVs)

1.1 Introduction

Production operators, survey, seismic, construction, and other such workers use All-Terrain Vehicles (ATVs) to access remote work sites. Typically ATVs are used in rough terrain or conditions that make it unsuitable for larger or standard vehicles.

This Safe Operating Procedure (SOP) applies to quads, argos, snowmobiles, side by sides, utility vehicles, etc.

Note: The use of three-wheeled all-terrain cycles or motorcycles is not permitted on Harvest worksites.

1.2 Policy

The ATV SOP applies to all Harvest Operations Corp. (Harvest) employees and contractors at Harvest facilities, worksites, or at locations where Harvest is the prime contractor.

1.3 Regulatory Requirements and Industry Recommended Practices

This SOP is based primarily on the Alberta, British Columbia, and Saskatchewan Occupational Health and Safety Codes and Regulations with information included from other government agencies, CSA/API standards, and industry best practices.

Harvest expects all workers and contractors to follow and work in compliance with the following legislation for the jurisdiction in which they are operating:

a) **Alberta Occupational Health and Safety Code (2009)** Part 18, Section 236 PPE, and Part 19, Sections 280 - 282 Powered Mobile Equipment
b) **Alberta Transportation Off-Highway Vehicle Regulation (2003)**
c) **Work Safe Alberta: Securing Pipe and Other Cargo on Vehicles**
d) **British Columbia Occupational Health and Safety Regulations (to August 2010)** Part 8, Section 8.12 Personal Protective Clothing and Part 16 Sections Powered Mobile Equipment
e) **British Columbia Motor Vehicle (All Terrain) Act (2010), Snowmobile (1997) and Prohibition Regulations**
f) **Saskatchewan Occupational Health and Safety Regulations (to 2007)** Part VII, Section 92 Personal Protective Equipment
g) **Saskatchewan All Terrain Vehicles Act (2006) and Regulations (1993)**
h) **Saskatchewan Snowmobile Act (2006) and Regulations (2009)**

1.4 Definition of an ATV or Off-Highway Vehicle

An ATV or off-highway vehicle means any motorized mode of transportation built for cross-country travel on land, water, snow, ice, marsh, swamp land or on other natural terrain as defined or designated by provincial acts and regulations. An ATV does **not** include motor boats, golf carts, or any other vehicle exempted from being an off-highway vehicle by regulation.

Note: In Alberta, a snowmobile is included in the ATV definition found in the Traffic Safety Act where as BC and Saskatchewan have separate acts and regulations for snowmobiles.

Snowmobile means a vehicle weighing not more than 500kg (approx 1,000lbs) designed primarily for travel on snow or ice, having one or more steering skis, and self-propelled by means of an endless belt or belts driven in contact with the ground; it includes a snowmobile conversion vehicle but does not include a competition snowmobile.

1.5 Responsibilities and Duties

1.5.1 Superintendents, Field Foremen, Worksite Supervisors, and/or Designated Alternates

a) Ensuring the All-Terrain Vehicle Safe Work Practice is implemented and followed at all facilities and work site locations in their area of responsibility.
b) Selecting the approved ATV training and maintenance service providers.
c) Ensuring relevant training has been provided to workers who are required to operate an ATV as part of their responsibilities and duties.
d) Ensuring routine safety checks, inspections, or audits are conducted to ensure the procedures for operating company-owned or employee ATVs are being followed.
e) Ensuring there is a system in place to distribute new regulatory requirements for operating and licensing ATVs.

Note: Harvest reserves the right, at its discretion, to refuse the use of an ATV supplied by a worker or contractor due to its mechanical/general condition (broken parts, excessive rust, and dents) or if the head/tail lamps, muffler, or exhaust system has been altered or tampered with.

1.5.2 ATV Operators

a) Following this safe work practice and their Worksite Supervisor's instructions for operating an ATV onto a Harvest lease, for parking, loading/unloading the ATV, and following posted signage.
b) Wearing and using the correct personal protective equipment (PPE) for the ATV being operated.

c) Having a valid ATV training certificate and demonstrating their competency to operate ATV equipment. Training certificates must be provided upon request.
d) Ensuring the ATV and any necessary safety equipment for the ATV is maintained and inspected as per manufactures recommended practice and as part of scheduled ATV inspections.
e) If applicable follow all working alone procedures when operating an ATV. Refer to Working Alone Critical Task
f) Reporting to their Supervisor any fluid spills, incidents, and/or unusual conditions which may occur while using an ATV.

1.6 Site Specific Orientation & Hazard Assessment, Safety Meeting and Safe Work Agreement

In all cases, site specific orientation & hazard assessment will be completed and a Tailgate/safety meeting held where all aspects of using an ATV to complete the job will be discussed.

For third party service providers, a Safe Work Agreement (SWA) will be issued for the work requiring the use of an ATV

For all non routine work preformed by Harvest personnel a JSA or JSA's will be required.

Note: All identified hazards must be communicated to other affected workers.

1.7 Potential Hazards

Includes but not limited to;

a) Injury due to ATV mishap while riding, loading/unloading, or attempting to free the vehicle when stuck
b) Working alone
c) Inadvertently initiating a forest, grass, or brush fire
d) Wildlife, livestock, and public
e) Weather exposure and avalanche
f) Drowning
g) Steep slopes or uneven terrain resulting in ATV rollover
h) Sinking in Muskeg
i) Ergonomic i.e. vibration, back strains
j) Noise i.e. Exposure to noise above the OEL
k) Pinch points, rotating equipment i.e. winching
l) Sliding off wooden paths, or bridges.
m) Contact with other vehicles.

1.8 Additional PPE Requirements

a) A DOT-approved motorcycle-type helmet with properly attached chinstrap and safety eye protection must be worn by the operator at all times while riding.
b) Helmets showing signs of fatigue, structural damage, past expiration date or involved in an incident must be removed from service.
c) If the operator continues to wear the motorcycle-type helmet when not riding on an ATV; a safety hard hat would not be required while working on a remote well or facility site.

Note: The work must not subject the worker to potential contact with exposed energized electrical sources.

d) Harvest recommends the operator wear a full-face, motorcycle-type helmet; however, an open-face, motorcycle-type helmet, with appropriate eye protection is also acceptable

Note: Sask Regs: Section 92, Workers must wear eye and face protection if the ATV does not have an enclosed cab, and where a worker is required to use protective headgear while working in cold conditions, the headgear must be equipped with a suitable liner and a cold weather face guard.

e) Footwear for ATV's, must be CSA-approved.
f) Additional wet or cold weather clothing may be necessary for travelling on ATVs in inclement weather (e.g.., snowsuits for snowmobiles). Workers must wear approved fire-resistant clothing (FRC) outerwear prior to working on live operating site.
g) Hearing protection must be worn if the ATV noise levels exceed provincial regulation.

1.9 First Aid and Survival Equipment

a) Where wildlife is a concern (e.g. bears, cougars, ungulates), one air horn and one bear spray canister must be carried with each ATV. .
b) A survival kit must be carried on each ATV. refer to appendix A.
c) Safety (survival) beacon if working in avalanche areas.
d) A floatation device or life jacket when operating an Argo or as required by the hazard assessment.
e) One small type "P" first aid kit must be carried with each ATV
f) An axe, shovel or Pulaski, and a small fire extinguisher must be carried with each ATV as required by the hazard assessment
g) ATV should be fitted with a permanent winch with tree saver strap, as well as a tow rope. Access to a snatch block, and an anchor that can be used when no other anchor point is readily available is recommended..

1.10 Training and Certification Requirements

ATV operators must complete an ATV safety training course and have received a certificate.

The minimum training requirements must include:

a) The operator's pre-trip inspection,
b) Use of personal protective equipment (includes clothing),
c) Operating skills according to the ATV manufacturer's instructions,
d) Emergency stops and swerving,
e) Driving over steep slopes, uneven terrain, ice and snow,
f) Driving on and/or crossing trails, roads and highways,
g) Provincial regulations (AB, BC, & SK) concerning the operation of ATV's,
h) Basic mechanical requirements, and
i) Loading and unloading the vehicle.

All ATV operators in areas in which there is a bear population should complete an authorized Bear Awareness or Bear Smart Training.

All ATV operators must have a valid driver's licence.

1.11 Refuelling Procedures

ATV operators must take the following precautions when refuelling an ATV:

a) No smoking within 7.5m (25ft) of a vehicle while it is being refuelled.
b) Never refuel an ATV within 7.5m of an ignition source.
c) Never refuel while the engine is running.
d) Never allow the fuel to overflow or spill (report all such occurrences).
e) Never use an object or device that is not an integral part of the hose nozzle valve assembly to maintain the flow of fuel.
f) Never refuel when the engine is hot.
g) Fuel must be stored and transported in an approved container (refer to Fire Safety and Prevention SOP).

1.12 ATV Parking at Harvest Facilities and Leases

When arriving at a lease, battery site or production facility; always park the ATV in the designated safe area(s) for vehicles. The brakes must be applied as per the manufacturer's recommendations.

Note: In all other situations, maintain a safe clearance distance of at least 7.5m (25ft) from any oil/gas production equipment, building, tank, sump, vent, valve or pipe.

1.13 General Operating Guidelines and Rules

a) Any Harvest contractor or employee must operate an ATV in a safe and responsible manner and in accordance with all current provincial and federal legislation.
b) The ATV must be operated, inspected and maintained as per the manufacturer's recommendations as outlined in the owner's manual.

Note: The operator's manual and proof of insurance and registration for the ATV must be kept in a secure place with the vehicle or at another location that is readily accessible to the operator.

c) The ATV must be equipped (i.e. brake lights, running lights and muffler), licensed and insured as per provincial off-highway vehicle regulations.
d) The license plate must be properly attached and displayed on the ATV.
e) All accidents must be reported as per Harvest's vehicle incident reporting procedures (refer to Incident Reporting and Investigation).
f) No firearms are to be carried while working for Harvest.
g) ATVs must be driven cautiously, slowly up or down steep slopes and creek crossings. Never ride at right angles along steep side slopes.
h) To prevent possibility of rollovers, use caution when braking especially while riding down hills. Operate the ATV slowly at all times.
i) Check and ensure muffler is in good working condition. Replace with genuine manufacturer muffler with spark arrestor when found damaged or corroded.
j) Carry O.E.M (Original Equipment Manufacturer) tool set.
k) When carrying tools, emergency equipment etc, on an ATV ensures the equipment is loaded and secured in an OEM container and mounted on OEM racks.
l) No passengers are allowed to ride on ATVs designed for "Driver Only". On two passenger-designed vehicles, the passenger must also wear an appropriate DOT helmet and eye protection.

Note: Do not exceed the ATV's weight, height, and other limits specified by the manufacturer.

m) Ensure brakes, throttle, and all lights are working properly on the ATV before each trip. Repair if necessary before riding the ATV.
n) ATVs must not be operated at a speed greater than is reasonable and safe as per road/weather conditions as determined by a proper risk assessment.
o) In all cases the maximum speed must NOT exceed 50km/hr.
p) Ensure the tank has an adequate volume of gasoline for the anticipated trip.

1.14 ATVs Crossing Highways

a) ATVs must not be operated on the travelled portion of a highway, except for the purpose of crossing the highway. The ATV operator must:

1) Stop the ATV before crossing the highway.
2) Yield to the right-of-way for any vehicles or pedestrians lawfully using the highway.
3) Cross the highway by the shortest and most direct route of travel.
4) Radio controlled roads may require radio monitoring before accessing.

1.14.1 Environmental and Landowner Considerations

a) Never leave an ATV running unattended in dry vegetation or grass.
b) Do not wash ATVs in any lake, creek, or river. It is a serious environmental offence to wash or clean an ATV in any fish-bearing lake or watercourse. Clean ATVs at designated vehicle wash facilities only.
c) Do not travel on river or lake ice unless the ice has been checked and approved for crossing by the provincial or federal authority. Avoid crossing fast-flowing water and watercourses of unknown depth. When crossing a watercourse the most direct route across the waterway must be used.
d) Do not unduly damage the environment and avoid planted crops or cultivated fields unless written permission has been received from the landowner or tenant to travel on their property.
e) Do not widen access (e.g. trails or seismic lines) or cut down trees without prior approval from the applicable regulatory body.
f) Do not harass or drive near livestock or wildlife. Wildlife habitat and nests must be left undisturbed.
g) Slow down and stop when you meet riders on horseback. Give them the right of way.
h) Close all opened gates that you have opened to gain access to an area!
i) Be aware of potential obstacles such as fence wires, boulders, tree stumps, and branches.
j) Do not lend a quad or snowmobile to someone who wants to "take a spin" for fun.

1.15 Loading or Unloading Procedure

A JSA must be developed and include the following points as a minimum See photos on the following pages for further reference:

1. Prior to unloading or loading an ATV by driving up or down the ramps attached to a pickup truck end gate or trailer, ensure the ATV ramps are of sufficient length to reduce the vertical angle to 40 degrees or less.

2. The ramps must be of sufficient load weight capacity (typically 750lbs or greater). A visible sticker or panel must indicate the maximum load weight capacity of ramps.

Note: The ramps must be sufficiently wide enough and have a surface finish which provides an adequate grip for the ATV's tires.

3. Prior to unloading or loading an ATV, straps must secure the ramps to the truck bed/ deck/end gate or trailer edge.

Note: Locking ratchet-style straps are recommended and must be rated for the weight of the ATV. Inspect straps for wear and tear. Do not use bungee cords.

4. The operator must wear a protective, DOT helmet and must proceed very slowly up or down the ramps.
5. If the vertical angle of the ramp is greater then 40 degrees (ground to ramp angle), then load and unload the ATV by use of a winch line with remote only. Do not ride on an ATV while winching up or down ramps. Avoid being down slope of the ATV
6. It is generally recommended that when loading an ATV the use of 4WD is used. This will give more traction and aid in preventing the ATV from spinning off the ramps.

1.16 Winching the ATV

A JSA must be developed and include the following points as a minimum:

a) Conduct hazard assessment and if necessary call for assistance.
b) When winching, one person directs the operation, the others stay clear.
c) The hook assembly must be locking and in good condition.
d) When spooling out winch line be aware of the presence of spurs and burs(wear appropriate PPE)
e) Use a snatch block if possible; make sure the winch line is securely fastened.
f) Never step over the line when tensioned.
g) After winching, spool cable smoothly on drum.

1.17 Securing the ATV on the Vehicle or Trailer

ATVs must be properly secured in/on the vehicle or trailer using Locking ratchet-style straps and must be rated for the weight of the ATV. Inspect straps for wear and tear. Do not use bungee cords.

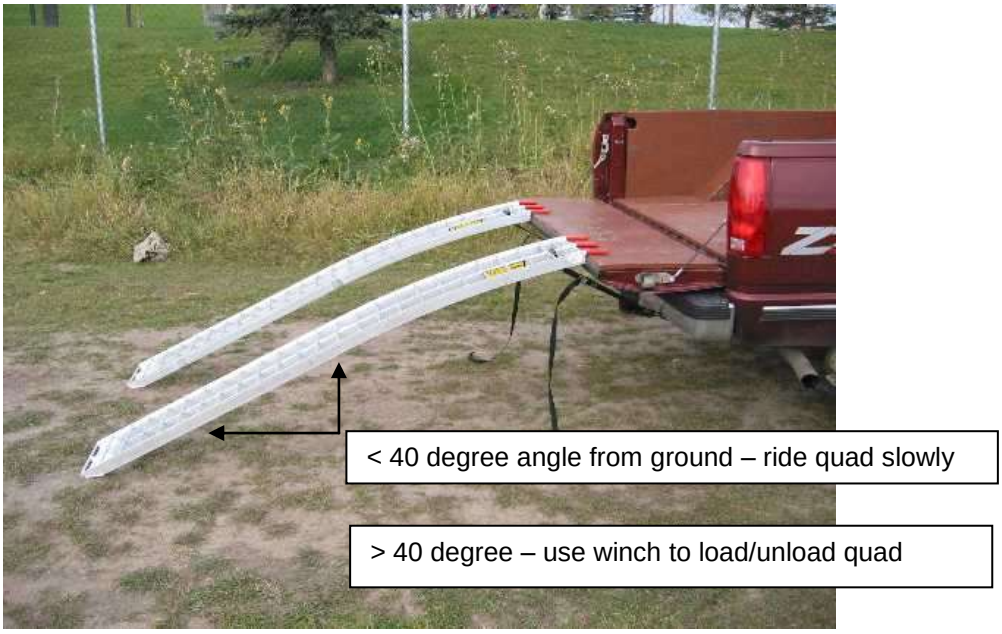
The ATV and any cargo (e.g., materials and tools) must be secured to ensure:

a) Nothing leaks, spills, blows off, falls from, falls through, or otherwise maybe dislodged from the ATV when it is being transported on a vehicle or trailer.

b) The ATV does not shift upon or in the vehicle or trailer to such an extent that the vehicle or trailer's stability or manoeuvrability is adversely affected.
c) Ensure straps do not rub and are not chaffed
d) Do not use winch line to secure the ATV. If the winch line is left connected to a point on the vehicle or trailer it must be left slack.

Note: The hauling or towing capacity of tow vehicles/trailers, trailer axle weight limits, or safety ratings of hitch systems must not be exceeded. Always use safety chains between the hitch and the trailer.

1.17.1 Proper Loading/Unloading of ATVs from Truck Bed or Trailer



1.18 Appendix A (Survival Kit Recommended List)

Pocket size survival kit items include;

- artificial flint striker
- tinder - e.g. cotton wool or dryer lint
- waterproof matches
- button compass
- wire saw - for shelter building
- water purifying tablets
- water storage container (ie hard container, soft container)
- Space (thermal) Blanket
- fishing kit - line, hooks, lures, snares
- snare wire
- folding pocket knife

If you choose to put your survival items in a small container, polish the inside of the lid so you can use it as a signal mirror. Pack your items with cotton wool to prevent rattling. Cotton is also excellent tinder and will make fire starting easier. To get your small container waterproof, seal it with adhesive tape.

Reference details provided from: http://www.wilderness-survival-skills.com/pocket-survival-kit.html

BIOLOGICAL HAZARDS

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2.0 BIOLOGICAL HAZARDS

2.1 Introduction

The purpose of the Biological Hazards Safe Operating Procedure (SOP) is to provide the operational framework for identification, assessment, and control of biological hazards at Harvest Operations Corps. (Harvest) worksites.

2.2 Policy

All Harvest employees and contractors are required to follow safe operating practices. This will ensure consistency and compliance with company, industry, and regulatory expectations relating to hazard and risk assessment, and providing effective control of known hazards in both routine and non-routine work situations.

A variety of illnesses and diseases can be transmitted from biological agents to humans by means of exposure. These biological agents include but are not limited to Hantavirus, West Nile Virus, Mould and Influenza. Workers exposed to biological hazards are at risk for serious or life-threatening illnesses.

2.3 Definitions

Bio-hazardous Material – A pathogenic organism known for its ability to cause disease in humans.

Expose – To come in harmful contact with an infectious material or organism from inhalation, ingestion, skin or mucous membrane contact, or percutaneous (i.e., needle/sharp-puncture) injury.

Hantavirus Pulmonary Syndrome (HPS) – A serious illness caused by a virus that is often fatal.

Hazard - Any situation, condition or thing that may be dangerous to safety or health of workers, or may cause damage or loss.

Hazardous Substance – A controlled product and a chemical, biological, or physical agent that, by reason of a property that the agent possesses, is hazardous to the health or safety of a person exposed to it.

Infectious Material or Organism – An infectious material or organism that has been identified in an approved manner as an infectious disease hazard that poses a significantly increased exposure risk to a worker or contractor.

Occupational Exposure – Reasonably anticipated, harmful contact with potentially infectious bio-hazardous materials that may result from the performance of a worker's duties.

Rodent – Mammal belonging to the order Rodentia characterized by continuously growing incisor teeth. Common rodents include mice, rats, prairie dogs, beavers, etc.

Virus – Microscopic infectious agent that requires a host in order to replicate.

2.4 Hantavirus

2.4.1 What is Hantavirus?

Hantavirus exists in a rodent's body (primary carrier is the deer mouse), saliva, urine and feces. Hantavirus infection (the virus) can occur via contact with live or dead rodents, rodent
bites, contact with eyes, contact with broken skin or open wounds, eating or drinking contaminated food, inhalation or ingestion of contaminated materials or dust from dried mouse droppings, urine and saliva from infected rodents. The most predominant hazard is inhalation of the virus that is then deposited into an individual's lungs.

There is no evidence that household pets or infected humans can transmit the disease.

2.4.2 Exposure

Exposure to Hantavirus should be maintained as low as reasonably possible. Exposure may occur anywhere workers could have contact with rodents, their saliva, urine, feces, or materials that have become contaminated with the above. Certain areas are more likely to harbor rodents than others such as attics, crawlspaces, field buildings, insulated pipe, etc. As a result, some workers may be more likely to encounter Hantavirus than others. Those who may be exposed include:

a) Anyone working or living (workers, farmers, hikers, and campers) in rodent contaminated sites or buildings (e.g., control rooms and camps);
b) Personnel who enter field site buildings (compressor buildings, well site shacks);
c) Personnel involved in mouse cleanup;
d) Personnel who are required to access ceiling, wall, floor, or subfloor spaces such as electricians and insulators; and
e) Personnel handling and receiving records and files stored or once stored at a field site (outbuildings).

2.4.3 Health Effects

A number of cases of Hantavirus infection have been reported in Alberta in the last few years. Deer mice are the main carriers of Hantavirus, although it is possible that other rodent species such as field mice, voles, and rats may also carry the disease. Hantavirus can cause a serious lung infection, called Hantavirus Pulmonary Syndrome (HPS) with an average fatality rate of 40 to 50%.

It is important to know the symptoms of Hantavirus Pulmonary Syndrome (HPS), since early treatment can significantly improve the chance of survival. Initial symptoms typically occur 4 to 42 days after first exposure (usually between 10 and 14 days) and consist of the following:

a) Fevers of up to 40° C
b) Headache, nausea, and vomiting
c) Fatigue, weakness, and chills
d) Diarrhea
e) Muscle aches
f) Cough
g) Severe abdominal pain

Although the above symptoms can all be caused by the flu; with HPS, the muscle aches affect mainly the lower back, buttocks, thighs, and other large muscle groups. The abdominal pain in HPS may be so severe that it is sometimes confused with acute abdominal disease, such as appendicitis. The patient usually feels much worse than a medical assessment would suggest. These facts may be useful in differentiating between flu and Hantavirus infection.

The second stage starts with shortness of breath. This is due to collection of fluid in the lungs (pulmonary edema) and is the primary symptom of HPS. Later on, a cough may develop. The HPS disease, however, can be confirmed through specific medical tests.

2.4.4 Control Measures

Preventative measures are based on minimizing contact with rodents and adopting good hygiene practices.

- Do not handle live or dead rodents (especially in outdoor settings);
- Do not touch or disturb mouse nests or burrows;
- Do not vacuum, dry sweep or use an air hose to clean areas where droppings are present, until disinfected;
- Do not occupy rodent infested buildings until cleaned;
- Do not drink untreated surface water;
- Do not sleep in cabins that have not been cleaned

Develop a Worksite Control Program that may include:

- Building inspections to look for signs of rodents;
- Notice to workers regarding the risk of exposure;
- Elimination of rodent harborage & populations;
- Use of appropriate removal and clean-up methods;
- Use of appropriate personal protective equipment (PPE) around high-risk environments.

The following recommendations apply to worksites:

- Store food and water in sealed containers;
- Mouse-proof buildings to prevent entry. Seal holes larger than ¼ inch in diameter (e.g. steel wool, screens, or cement);
- Mouse-proof garbage cans with tight-fitting lids;
- Avoid creating dust and disinfect contaminated material before clean-up to reduce chance that virus will get into the air;
    - Open doors and windows and vacate building for a minimum of 30 minutes;
    - Mix bleach and water (1:10) solution immediately prior to use (do not use bleach in the presence of oil);
    - Carefully wet down area with bleach solution;
    - Carefully wipe or wet-mop all surfaces with bleach solution
- Dispose of rodents and droppings in sealed bag and incinerate or place in garbage;
- Consider a pest exterminator for heavily infested areas;
- Procedure for clean-up includes:
    - Cover any areas of broken skin;
    - Wear rubber gloves, coveralls, goggles and rubber boots;
    - Wear a respirator with a high efficiency particulate filter (i.e. P100, N100 or R100);
    - Disinfect non-disposable clothes and gloves before removal;
    - Wash hands and face thoroughly with soap and water.

2.5 West Nile Virus

2.5.1 What is West Nile Virus?

West Nile virus is an infection that is carried by mosquitoes in many countries of the world, including Canada and the USA. Mosquitoes are infected with the virus when they bite an infected bird. People then get the virus when the infected mosquito bites them.

2.5.2 Exposure

You cannot get West Nile virus by touching or kissing a person with the virus.
In most parts of Canada, the risk of becoming infected with West Nile virus is greatest between mid-April and the first hard frost in late September or October. Most human infections occur between mid-July and early September. Remember that mosquitoes are often most active at dawn (first light) and dusk (just before dark).

People at higher risk for serious health effects from West Nile virus include:

- people over the age of 50
- those with chronic diseases, such as cancer, diabetes, alcoholism or heart disease
- those who require medical treatment that may weaken their immune system, such as chemotherapy for cancer

2.5.3 Health Effects

Most people (70%-80%) who are infected with West Nile virus have no symptoms at all. Some people have mild symptoms that include:

- fever
- headache
- mild rash
- body aches (might include swollen lymph glands in the neck)

First symptoms usually appear within 2 and 15 days after infection.
Very few people (fewer than 10% of those with symptoms) have more serious symptoms. In many of these cases, the infection affects the central nervous system (nerve tissues in the brain and spinal cord). In addition to the symptoms above, further symptoms may include:

- stiff neck
- nausea and or vomiting
- difficulty swallowing
- drowsiness
- confusion
- loss of consciousness
- muscle weakness
- reduced muscle coordination (trouble walking)
- blurred vision or worsening eyesight
- numbness

Recovery can take a week for mild cases and up to a year for more serious cases. More severe cases can be fatal.

2.5.4 Control Measures

The best way to avoid infection with West Nile virus is to prevent mosquito bites. You can do this by minimizing your exposure to mosquitoes, and by getting rid of mosquito breeding grounds.

Minimize exposure to mosquitoes by:

- using insect repellents (bug sprays or lotions) that contain DEET (diethyltoluamide) or Icaridin
- wearing light coloured protective clothing
- making sure doors and windows (and associated screens) fit tightly and have no holes

Mosquitoes lay eggs in standing water. Even a small amount can act as a breeding ground. Reduce the number of mosquitoes by:

- emptying standing water from pool covers, garbage cans and similar outdoor items
- changing the water in wading pools, birdbaths and pet and livestock water dishes regularly
- covering rain barrels with screens and keeping eaves troughs clear of leaves and debris
- removing unused items (like old tires) that can collect water

2.6 Mould

2.6.1 What is Mould?

Mould is the common word for any fungus that grows on food or damp building materials. Fungi are found almost everywhere. They get nutrients by absorbing them from surrounding materials. Fungi are efficient decomposers of dead plant and animal waste. Fungi also feed on many building materials and textiles, including gypsum board, insulation, rubber, wood, carpet, adhesives, paper, leather and cardboard. Fungi will grow in paint, solvents, fuel and in many other industrial products.

In order to reproduce, moulds release small "spores" into the air and these spores are small enough that people can actually breathe them in.

2.6.2 Exposure

Since moulds are abundant in nature, people are exposed to them daily. Most people exposed to background levels of mould have no health effect. However, some individuals, when exposed to high levels of moulds may experience adverse health effect.

For mould, the main ways we are exposed are by inhalation and ingestion. There can also be health effects caused by skin contact, such as Athlete's foot. Health effects from mould and other fungi can be from exposure to living or dead fungal cells, fungal parts such as hyphae or mycelium, fungal spores and mycotoxins.

2.6.3 Health Effects

Most healthy people have little or no reaction when exposed to moulds. If symptoms do occur they are most likely to be:

- runny nose;
- eye irritation;
- respiratory irritations;
- rash or other skin irritations;
- cough;
- congestion;
- aggravation of asthma; and/or
- headache

These symptoms are usually temporary and will go away when exposure to the mould stops.

Some people are more vulnerable to the effects of mould than others, for example, people with weakened immune systems.

2.6.4 Control Measures

The prevention of mould growth is the first step to manage mould at the work site. Because mould spores can be found almost anywhere, the key to preventing mould growth is to limit the availability of water. This is accomplished by:

- keeping building materials dry
- regularly cleaning carpets and other surfaces
- promptly repairing water leaks
- properly maintaining heating
- ventilating
- avoiding high humidity levels
- using HEPA-filtered vacuum systems
- ensuring central vacuum systems are vented to the outdoors

You can also control the food source to some degree by using materials that provide fewer nutrients for the mould to grow.

A P100 respirator is to be worn if work must take place in lightly mould infested areas.

2.7 Influenza

2.7.1 What is Influenza?

Influenza, commonly called the flu, is a viral infection of the nose, throat and lungs. It spreads easily from person to person. Every year millions of Canadians catch the flu, usually in late fall to early spring. Some people are only mildly affected, while others get very sick.

2.7.2 Exposure

Your risk of getting influenza is lower in summer and early fall, but higher in winter and spring. Whether you get sick depends on how healthy you are, and whether you are exposed to other people who are infectious.

Influenza is caused by a virus. The virus can live in your nose, mouth, and eyes, and on your skin. It is highly contagious, meaning it spreads very easily. When someone who has the flu sneezes, coughs or talks, they release tiny droplets into the air. These droplets contain the flu virus. If they get into your mouth, nose or eyes, you can get infected. The droplets can also land on things like doorknobs, phones, tissues or kitchen utensils. If you touch them and then touch your own eyes, nose or mouth, the virus can pass to you and make you sick.

Some people are more likely to suffer influenza-related complications and are more likely to be hospitalized because of these complications.

Those most at risk of complications related to the flu include:

- people with health conditions such as cancer, diabetes, heart disease or lung disease, obesity;
- people 65 and older, or live in nursing homes or long-term care facilities;
- children between 6 months old and 5 years old;
- pregnant women; and
- Aboriginal people.

2.7.3 Health Effects

Flu symptoms usually start suddenly with some or all of the following:

- fever
- cough;
- a sore throat;
- muscle aches and fatigue;
- loss of appetite;
- runny or stuffy nose

Some people, especially children, may also have stomach upset and pain, vomiting and diarrhea. Not everyone with the flu will have a fever.

Most people recover from the flu in a week or 10 days. But others may develop serious complications, such as pneumonia, that can send them to hospital.

2.7.4 Control Measures

Health Canada recommends one of the ways to protect yourself from the flu is to get a flu vaccine every year.

Some other ways to stay healthy and prevent the spread of the flu include:

- Clean your hands frequently.
- Cough and sneeze into the bend of your arm, not into your hand.
- Avoid touching your eyes, nose and mouth with your hands.
- Clean and disinfect things and surfaces that a lot of people touch, like doorknobs and TV remotes.
- Keep your immune system strong: eat healthy foods and be physically active.

2.8 Training

All employees who are at elevated risk for exposure to biological hazards must be trained in the following:

- Harvest Operations Corp. Biological Hazards Safe Operating Procedure
- Applicable worksite control program
- Use of PPE required for the task

Additional training is required when changes, such as modifications of tasks and procedures or implementation of new tasks or procedures, affect the employee's occupational exposure.

2.9 Responsibilities

Roles and responsibilities for Environment Health and Safety are described in the Harvest Operations Corp EHSMS Section 1;

- Roles and responsibilities specific to this SOP are described below;

2.9.1 Worksite Supervisors

Worksite Supervisors are responsible to:

- Identify work tasks potentially involving exposure to biological hazards.
- Ensure that the risks of exposure to biological hazards are assessed, and the appropriate controls are implemented, and where necessary, a worksite control program is developed.
- Maintain essential supplies in first aid kits.
- Ensure all workers have been provided awareness training on this SOP.

2.9.2 Workers and Contractors

Workers are responsible to:

- Read and become familiar with this SOP
- Implement and maintain a current worksite control plan that is kept on site, available for review.
- Be trained in the equipment necessary to minimize exposure.

2.10 References

2.10.1 Internal References

1. EHSMS Section 2.0, Hazard Identification, Risk Assessment & Control
2. EHSMS Section 1.0, Management Commitment & Responsibilities

2.10.2 External References

1. Work Safe Alberta, Best Practices for the Assessment and Control of Biological Hazards (Volume 2, 2009)
2. Work Safe Alberta, Bulletin Hantavirus: Information for Employers and Workers, August 2010
3. CAGC, Hantavirus Health Effects & Protection Guideline, 2000
4. Work Safe Alberta, Bulletin Do I have a Workplace Mould Problem, August 2010
5. Work Safe Alberta, Best Practices Mould at the Work Site, July 2009
6. Health Canada, Flu (influenza), http://healthycanadians.gc.ca/diseases-conditions-maladies-affections/disease-maladie/flu-grippe/index-eng.php
7. Public Health Agency, West Nile Virus, http://www.phac-aspc.gc.ca/id-mi/westnile-virusnil-eng.php

2.11 Management of Change

Proposed changes to this practice can be directed to EH&S@harvestenergy.ca

BYPASSING SAFETY DEVICES

3.0 BYPASSING SAFETY DEVICES

3.1 Background

Equipment shutdown systems (electrical, pneumatic or mechanical) should not be bypassed without serious considerations of all the consequences and conducting a hazard assessment. Preferably, the equipment should be taken out of service to make necessary repairs.

However, it may be necessary to work on a piece of equipment with some manner of bypassing or jumping the shutdown temporarily, such as when needing to:

- Service instrumentation on some equipment
- Avoid a major loss of production or serious freeze up while repairs are in effect

3.2 Responsibilities

Worksite Supervisor is responsible to:

a) Ensure that only a qualified person is designated to disable and/or bypass an equipment protection device.

b) Ensure a Site Specific Orientation & Hazard Assessment is conducted and documented to identify the risk and required controls in order to disable and/or bypass an equipment protective device.

c) Ensure the senior operator and the maintenance worker identify and document:

- the reason for disabling and/or bypassing the device
- the approximate length of time the device is required to be disabled and/or bypassed
- who disabled and/or bypassed the device and the name of the alternative worker who knows the bypass/disabled location
- who will continuously monitor the disabled and/or bypassed equipment, if it does not have an alternative safety device (such as a secondary relief system and/or a short bypass timer setting such as fire eyes do)
- who will remove the disabling and/or bypass
- alternate protection control devices (manned or secondary backup controls in place)

Caution: If the equipment cannot be continuously monitored (control panel and/or manned), then it must be shut down.

d) Ensure the senior operator and the person installing the disabling and/or bypass prepare “Danger Tags”, noting on them that the safety device will be disabled and/or bypassed, and place these tags in the appropriate locations.

e) Ensure the senior operator and facility operator note the installation and the location of the disabling and/or bypassed device in their respective logs.

f) Upon reinstallation of the safety device:

- remove the “Danger Tags”
- ensure the senior operator and the facility operator record in the log that the disabling and/or bypass has been removed

Note: In all cases of disabling and/or bypassing equipment protection devices, the supervisor must approve.

ENERGY ISOLATION

3.4.4 ENERGY ISOLATION

3.4.4.1 Blinding & Blanking

3.4.4.2 Breaking Lines

3.4.4.3 Bypassing Safety Shutdown

3.4.4.4 *Electrical Safety (under development)

3.4.4.5 Lockout – Tagout (Zero Energy)

3.4.4.6 Purging

***Forms currently under development.**

BLINDING & BLANKING

1.0 BLINDING & BLANKING

1.1 Introduction

Blinding and blanking, which is also referred to as “positive isolation”, is required whenever the act of opening pipes, equipment, or entering vessels and confined spaces could present a potential for injury or equipment damage due to the hazardous nature of materials (e.g. flammable or toxic), high pressure, or high temperature.

Blinding and blanking methods includes but not limited to:

- Attaching or inserting a blank, blind, or threaded plug at the point of isolation.
- Utilizing an existing single block valve or double block and bleed system.
- An approved written Critical Task/JSA certified by a professional engineer as a means for providing an equivalent level of safety.

1.2 Policy

This Blinding and Blanking Safe Operating Procedures (SOP) applies to all workers and contractors working at Harvest Operations Corp. (Harvest) facilities or at work site locations where Harvest is the contract operator.

1.3 Regulatory Requirements

The Alberta Occupational Health and Safety Code (Part 15, Section 215.4(1)) “Managing the Control of Hazardous Energy” states – To isolate piping or a pipeline containing harmful substances under pressure, an employer may use:

a) A system of blanking or blinding, or
b) A double block and bleed isolation system providing:

   i. Two blocking seals on either side of the isolation point, and
   ii. An operable bleed-off between the two seals.

Note: Regulatory requirements specific to British Columbia and Saskatchewan are noted in the applicable sections of this SOP.

Competent, in relation to a person, means adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Harmful substance means a substance that, because of its properties, application or presence, creates or could create a danger, including a chemical or biological hazard, to the health and safety of a worker exposed to it.

Hazardous Energy means electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravitational, or any other form of energy that could cause injury due to the unintended motion, energizing, start-up or release of such stored or residual energy in machinery, equipment, piping, pipelines, or process systems.

1.3.1 Types of Blinds or Blanks

Blind or Blank: A metal plate inserted between pipe flanges and across openings at locations to prevent the flow of gas or liquid in either direction.

Spectacle Blind: A spectacle blind looks like a figure eight with a hole in one lobe and the other lobe is solid. This blind is permanently installed and once the flanges are loosened, it can be rotated to stop or allow the flow through a pipe.

Blind Flange: A full-rated pipe fitting used to close the flanged end of an open pipe/valve.

Tapped Blind Flange or Screwed Plug: A full-rated pipefitting used to close the flanged end of an open pipe or valve with a threaded tap for installing a valve. A vent valve is recommended for the controlled release of any pressure build-up prior to removal of the blind flange.

1.4 Responsibilities and Duties

1.4.1 Superintendents, Field Foremen, Lead Operators

a) Ensuring the Blinding and Blanking SOP is implemented and followed at all Harvest facilities and work site locations in their area of responsibility.
b) Ensuring the hazards of installing blinds and blanks are assessed, and controls are implemented and responsibilities assigned where necessary.
c) Following and maintaining a system to identify and monitor permanently installed blinds or blanks at each facility or work site.
d) Implementing a system to identify and monitor the status of blinds and blanks when equipment is temporarily taken out of service for maintenance.
e) Ensuring relevant training has been provided to workers who are required to supervise or perform blinding/blanking operations.
f) Conducting routine safety checks, inspections, or audits to ensure the blinding and blanking procedures and/or other control measures are being followed.
g) Developing Critical Tasks/JSAs and ensuring workers have been properly trained in the procedures.

1.4.2 Worksite Supervisor and/or Designated Alternates

a) Ensuring the Blinding and Blanking SOP is implemented and followed at all Harvest facilities or worksites under their supervision.
b) Conducting a site specific orientation & hazard assessment to identify all existing and potential hazards and the necessary controls to eliminate or reduce the risk associated with the work. Refer to the EHSMS to ensure all applicable standards and procedures have been considered (e.g. confined space code of practice)

Note: All fuel, oxygen, and ignition sources must be identified.

c) Complete and implement an ERP plan for the task (refer to the ERP template)
d) Ensuring the correct isolation method is identified for the primary task requiring blinding and blanking of piping or equipment and recording it on the Safe Work Agreement (SWA), if required.
e) Following any Blinding and Blanking Critical Task/JSA and ensuring workers have been properly trained in the approved procedures.
f) Implementing and maintaining a system to identify and monitor permanently installed blinds or blanks at each facility or work site under their supervision.
g) Implementing a system to identify and monitor the status of blinds and blanks when equipment is temporarily taken out of service for maintenance. If the equipment requires more than two blinds/blanks to be installed, as part of the job, a Blind/Blank Control List must be used and maintained current until the equipment is returned to service.
h) Using a blind/blank tag board at large facilities.
i) Ensuring the correct line, vessel, and/or equipment is depressurized and drained thoroughly.
j) Ensuring all precautions have been taken, the necessary approvals obtained (e.g., BC WCB, certified engineer), and an approved work plan or Critical Task/JSA prepared so the work can proceed safely when:

- the pressure cannot be bled to a “zero” energy state
- the absence of pressure cannot be verified
- when single valve or double block valve isolation must be used

k) Ensuring that piping or equipment that is blanked or blinded is clearly marked or tagged to indicate that a blank or blind is installed.
l) Ensuring containment of any and all discharged liquids or gases.
m) Ensuring proper PPE is available and is being used correctly in accordance with the applicable SDS information.
n) After the work is complete, ensuring that all blinds, blanks, and plugs have been removed and the valves and switches have been returned to their original operating position

o) Inspecting the work area and adjacent areas to determine they are in safe condition.
p) Ensuring workers are trained in this practice and competent to undertake isolation procedures and Critical Tasks/JSAs that are required to complete the work.

Note: For further information refer to the Due Diligence Checklist - Worksite Supervisor

1.4.3 Workers

a) Following this SOP, all established procedures, JSAs and processes in accordance with the site specific orientation & hazard assessment.
b) Complying with the conditions recorded on the Safe Work Agreement (SWA).
c) Complying with the conditions and PPE requirements in accordance with the applicable SDS and recorded on the SWA.
d) Reporting to the Work Site Supervisor any spills, incidents, and/or unusual conditions which may occur during the work.
e) Refuse to perform work when unsafe conditions exist (as defined in Provincial Occupational Health and Safety legislation).
f) Refuse to perform work when they are not competent to perform the task.

- Check tools and equipment, including personal protective and safety equipment for hazards before using them.
- Know the location, type and operation of emergency equipment. Fully understand the emergency rescue plan.

Note: Stop work if conditions change.

1.5 Conditions Requiring Blanking, Blinding or Isolation by Separation of Piping Spools

This includes but not limited to:

a) Any equipment requires entry by personnel
b) Any open-ended connections on equipment being returned to operating condition
c) A connection to the operating equipment becomes obsolete (when removal of the connection is not practical)

Exceptions to this type of work should only be considered when:

a) Equipment is removed from service, but personnel entry is not required. Locked tagged block valves must be used if the equipment is not in continuous attendance of the worker performing the isolation service/repair work.
b) Pipeline maintenance procedures require that work be completed behind a single Stopple™ plug.

Note: The Harvest Work Site Supervisor, in consultation with the Superintendent or a certified engineer, will identify those situations or tasks not requiring blinding or blanking. All contractor procedures must be reviewed and approved by Harvest.

1.6 Positive Isolation Methods

Lines, equipment, and vessels must be isolated by one of or a combination of the following methods identified during the site specific orientation & hazard assessment.

1.6.1 Blinding, Blanking or Disconnecting and Plugging

Blinding/blanking or disconnecting and plugging are the preferred methods for isolating equipment. When a blind/blank or plug is being installed comply with the following:

a) The Critical Tasks/ JSAs / blinding blanking procedures must be followed.
b) Proper pressure-rated blinds/blanks, plugs, and gaskets must be used.
c) Gaskets must be installed on the pressure side and, where possible, on both sides to prevent damage to flange faces.
d) A blind/blank or plug tag system must be used at all Harvest work sites.

1.6.2 Double Block and Bleed

If installing blinds/blanks creates a hazard and disconnecting and plugging is impractical, the recommended alternative for isolating equipment is closing the double (block) valves with a bleed valve in between. The bleed valve size between the block valves must be sufficient to handle potential upstream block valve leakage without applying pressure to the downstream block valve. Block valves must be locked and tagged in the closed position and the bleed-off valve must be locked and tagged in the open position.

If a double block and bleed isolation system is used:

a) Ensure that the bleed line and valve assembly is of adequate capacity to drain the interstitial space (i.e. the space between the two block valves)
b) The bleed for a liquid system must be at a lower elevation than the block valves and some method is in place to catch any bleed (liquid or gas),
c) All valves must be locked out in the correct open or closed position,
d) The downstream block valve must be checked to ensure that it is capable of safely withstanding the line pressure,
e) The bleed valve must be checked to ensure that it remains clear of obstructions while the work is being conducted or confined space is occupied, either by continuous automatic monitoring or by manually checking within 20 minutes (BC requirement) before worker entry, or before re-entry after the work is completed or confined space has been vacated for more than 20 minutes.

In Saskatchewan the time interval is not specified but time must be recorded on the tag.

f) In the event of discharge from the bleed line resulting from failure of the upstream block valve, all workers must immediately stop work or exit a confined space. A new site specific orientation & hazard assessment and SWA must be issued before work resumes or a worker re-enters the space.

In British Columbia: When entering a confined space, the adjacent piping must be controlled by either disconnecting the adjacent piping or isolating it using blanks or blinds that meet the requirements of section 9.20 (BC Work Safe Regulations) or using a double block and bleed system that meets the requirements of section 9.21.

1.6.3 Single and Double Block Valves (no bleed)

This procedure can only be used if approved by a certified professional engineer and/or Harvest's Superintendent (if applicable the BC WCB). It must be based on a documented site specific orientation & hazard assessment with a written Critical Task/JSA procedure.

Isolation shall be limited to the following operations:

a) Opening equipment to establish positive isolation (i.e., install blinds, etc.).
b) Work to be done is short term in nature.
c) Work is not to be left unattended.
d) The work being performed is not hot work or confined space entry work.

Examples of operations where the use of single valve isolation may be appropriate in accordance with a site specific orientation & hazard assessment are:

a) Changing pressure gauges,
b) Cleaning sight glasses,
c) Replacing needle valves,
d) Launching a pipeline pig,
e) Replacing fluid chokes, or
f) Work approved by certified professional engineer and/or Harvest's Superintendent (if applicable the BC WCB)

Note: In British Columbia, except when used in an acceptable double block and bleed system, the closing of one or more valves in a line is not an acceptable means of isolation unless approved by the BC WCB and a Critical Task/JSA is certified by a professional engineer.

Note: In some circumstances, it may not be reasonably practicable to provide blanking, blinding or double block and bleed isolation. An alternate means of isolation must:

a) Adequately protect workers,
b) Be a written Critical Task/JSA procedure approved by Harvest
c) Be certified as appropriate and safe by a professional engineer for the particular conditions of anticipated pressure, temperature, and service. This approval must be documented via the MOC process.

Note: A procedure or a blind/blank that is certified by a professional engineer, the record of its certification, location, and conditions of service must be kept on file and a copy attached to the SWA.

d) In British Columbia approved by the WCB.

1.7 Site or Job-Specific Isolation Requirements

1.7.1 Hot or Cold Work in Individual Vessels or Units

When a confined space entry is required for hot or cold work on an individual vessel or equipment, each connection to the vessel must be blanked or physically disconnected and plugged prior to entry. The blinds/blanks must be installed at the vessel nozzles.

Note: If confined space entry is required full pressure blinds must be used for isolation. When cold work is to be performed without vessel entry (e.g. pulling an exchanger bundle for cleaning or shop repairs), blanks are not needed unless they are required to prevent the hazardous escape of hydrocarbons or toxic material.

In British Columbia a hazard assessment must be conducted to ensure a worker is not exposed to levels that exceed those listed in the screening criteria for heat or cold stress exposure ACGIH Standard *Threshold Limit Values (TLV®) and Biological Exposure Indices.*

In Saskatchewan the hazard assessment must comply with Section 70 *Thermal Conditions* in Saskatchewan's OHS Regulations.

1.7.2 Cold Work During Turnarounds (where vessel entry is not required)

When an entire facility is out of service, all gas, oil, chemical and utility lines will have been blanked or disconnected at battery limits and the facility purged to a state where it will be considered gas free. Blanking of individual vessels may not be necessary for cold work which does not require vessel entry.

Attention shall be given to blinding/blanking requirements when interconnecting piping equipment imposes additional risks**.** Vessels, pumps, exchangers, mixing columns, or other pieces of equipment where oil / gas may be trapped is a concern when only block valves are used for isolation between the individual pieces of equipment.

1.7.3 Hot Work During Turnarounds

When an entire facility or unit is out of service, all oil / gas, chemical and utility lines will have been blinded/blanked or disconnected at the facility perimeter and the unit will be considered gas free. When hot work is to be performed in individual vessels, each line to the vessel must be blinded or blanked at the flange closest to the vessel.

Note: Where block valves with flex gates are found, the space between the gates must be drained through the drain provided.

1.7.4 Inaccessible Flanges

Where the closest flange to the vessel is inaccessible or would require extensive scaffolding, the line may be blanked/blinded at the next accessible flange if:

a) There are no traps, pockets, or connecting lines between the vessel and the point of blanking.
b) Certified by a professional engineer and/or Harvest's Superintendent (if applicable the BC WCB)
c) It can be assured that the line is completely free of all flammable/toxic or pressurized components between the vessel and the point of blanking.

Note: Where block valves are installed in interconnecting lines, they should be closed. Special care should be exercised in the shutdown of units to prevent the accumulation of hydrocarbons in these valves. The certifying professional engineer and Harvest's Superintendent must assess the advisability of closing off double gate valves in interconnecting lines between vessels.

1.8 Pre-Job Preparation

1.8.1 Site Specific Orientation & Hazard Assessment

Pre-job preparation includes conducting a site specific orientation & hazard assessment specific to the task being performed to determine the correct isolation method necessary to eliminate or mitigate the potential hazards.

Note: All affected workers (i.e. the work crew) must be included in the site specific orientation hazard assessment and in the control or elimination of those identified hazards. Further, all other workers at the work site or at other work sites affected by the work or hazards identified in the site specific orientation & hazard assessment and SWA

must be informed of the hazards and of the methods used to control or eliminate the hazards.

Potential hazards include but not limited to:

a) Fire or explosion from flammable gases being ignited (e.g., sparking or static electricity),
b) Trapped high-pressure liquid/gas behind a plugged line,
c) Oxygen deficiency due to toxic vapour and liquids,
d) Auto start drivers in the system that are not locked out,
e) Pipe kick due to improper alignment or pressure build-up
f) Environmental damage due to spills.
g) Naturally Occurring Radioactive Materials (NORMs)
h) Asbestos
i) Iron Sulphides

When conducting the site specific orientation & hazard assessment, consider the following:

a) Rating
- Is the blind, blank or plug properly rated?

b) Location
- Will the blind effectively isolate the equipment in the location selected?
- Is there access to the selected location?
- Can the blind be safely removed should conditions change?

c) Size
- Is the blind the appropriate size for the line being blinded?

d) Equipment
- Are you using the right tool for the job?
- Is the equipment appropriately rated for the task at hand? (e.g. intrinsically safe, explosion proof)

e) Static electricity and the use of bonding and grounding cables

1.8.2 Safe Work Agreement/JSA

Identify the operating authority for the work site. If a SWA is issued the method of isolation must be recorded on the SWA.

In most situations, a SWA will be issued for the primary task such as construction, repairs, or maintenance that requires equipment or a piping system to be blinded or blanked prior to commencing the work.

If a SWA is not issued (e.g. work to be completed by Harvest personnel) a JSA must be completed with the method of isolation recorded on the JSA (refer to section 2 Hazard identification, risk assessment and control).

Notes:

1. Workers are not authorized to deviate from the procedures approved under the site specific orientation & hazard assessment and recorded on the SWA (this includes all checklists and attachments).

2. If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.

1.8.3 Pre-Job Safety Meeting

A pre-job safety meeting is required so that all affected workers know and understand:

a) The identified hazards, the control measures and those personnel assigned to implement the controls, as recorded on the SWA.
b) The isolation method selected and their job responsibilities and duties as it relates to the job.

1.8.4 Additional PPE Requirements

Additional PPE that may be required as per the site specific orientation & hazard assessment includes but not limited to:

- Appropriate respiratory protection (SCBA) (SABA)
- Harness and lanyard
- Face shield
- Chemical protection as identified in the SDS

Note: If vessel/confined space entry is required, the practice is isolation with full pressure blinds. If during the course of installing blinds, workers could be exposed to hazardous substances, appropriate PPE must be worn as per the site specific orientation & hazard assessment.

1.8.5 Blind Tag Board or List

Depending on the size or complexity of the job (e.g. complete unit turnaround or partial shutdown), the Worksite Supervisor should either:

a) Install a Blind/Blank Control Board with numbered metal tags attached to hooks on their corresponding numbered spaces. This will provide a quick view of all blinds installed during maintenance work.

b) Adopt a Blind/Blank control board system, at centralized and/or large facilities.
c) Adopt a Blind/Blank control list system at small facilities.

Note: A “Do Not Operate” tag must be fixed to all blinds and blanks so it clearly indicates that a blind or blank has been installed.

A Blind/Blank Control List must contain the following information, as a minimum:

a) Job identification and SWA number
b) Blind/blank ID number
c) Installation sequence, if necessary,
d) Location description (on equipment)
e) Blind size specification, rating, and type
f) Date of installation and removal
g) Installer or SWA Issuer’s name and initials
h) Remover or SWA Issuer’s name and initials

Note: Refer to the Blind/Blank Control List Form

1.8.6 Blind and Blank Specifications

All blinds and blanks must be sufficient in metal strength to withstand any pressure they might be subjected to.

a) Blinds must conform to Harvest’s adopted design specifications or shall be temperature/pressure design-rated blinds.
b) A blind, other than a spectacle blind, must have a handle which extends at least 51 mm (2 inches) beyond the pipe flange in order to eliminate any doubt whether the in-line device is a blind or spacer.
c) Blinds must have the proper rating stamped on the handle.
d) A blank or blind must be manufactured in accordance with the specifications of one of the following standards:

- ANSI Standard API 590-1985, *Steel Line Blanks*
- ANSI Standard ASME/ANSI B16.5-1988, *Pipe Flanges and Flanged Fittings*
- ANSI Standard ASME B31.1-1992, *Power Piping*
- ANSI Standard ASME B31.3-1993, *Chemical Plant and Petroleum Refinery Piping*

e) If a blank or blind is certified by a professional engineer, a record must be kept of its certification, location and conditions of service.
f) If required, an allowance for corrosion must be made in the design of a blank or a blind.

1.8.7 Blind Selection and Preparation

Before work begins, the Worksite Supervisor must:

a) Obtain the correct pressure-rated blinds (includes blanks, skillets, pancake and plugs) and gaskets.
b) Obtain the recommended clevis and wedge-type (Titan) flange spreaders.
c) Prepare in duplicate, a Blind/Blank Control List of the blinding or blanking required to complete the work safely. Record the installation and removal sequence that must be followed.
d) Retain one copy and forward the other to the Superintendent or the Worksite Supervisor in charge of maintenance.
e) Review the Blind/Blank Control List and inspect the equipment thoroughly prior to each blanking operation to ensure that no connecting lines were overlooked.
f) Ensure the installer of the blind attaches a numbered tag from the Blind/Blank Control Board on each blind and record the number of the tag on the Blind/Blank Control List.
g) Ensure that the Blind/Blank Control List with all the information remains at the work site throughout the duration of the job.
h) Alternate methods may be used providing the system meets the tracking objectives noted above and is approved by the next level of supervision.

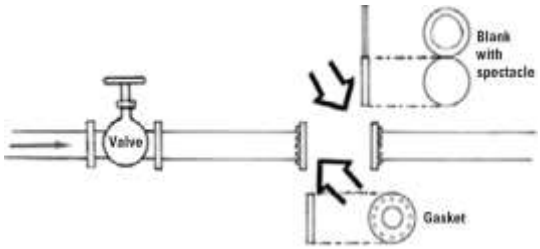
1.8.8 Depressuring, Draining and Purging

The procedures in Harvest's Purging SOP and/or approved Critical Tasks/JSAs must be followed.

1.9 Installing Blinds and Blanks

When installing blinds and blanks, proceed with the following steps:

1. Install all blinds according to the sequence identified on the Blind/Blank Control List. Where applicable, approved Critical Tasks/JSAs must be followed.
2. Ensure all valves are locked/ tagged in the closed position to shut off upstream flow.
3. Cathodic protection must be shut down and flanges bonded prior to installing a blind or disconnecting the piping. Heat tracing should also be shut off on piping.
4. Depressurize and/or drain the pipe on the downstream side before installing the blind.
5. Have a blind of the proper diameter/thickness, rated for the design pressure at the point of isolation and, if possible, have two new gaskets ready.



6. Install the blinds at the closest flange to the vessel as possible.
7. Work above and to one side of the pipe's direction or line of fire.
8. Loosen the bolt farthest away from you first.
9. Be prepared to close the joint if there is a liquid or gas release.
10. Call for assistance if the release can not be stopped.
11. Loosen the other bolts; never remove all the bolts before breaking the flange.
12. Spread the flange and remove the old gaskets.
13. Place new gaskets on the high-pressure side and, where possible, on both sides of the blind to prevent damage to flange faces.
14. Use a punch or equivalent tool to center the gasket; do not use your fingers.
15. Slide in the blind or blank, ensure a tight fit and correct alignment and re-torque bolts as per manufacturer's specifications.
16. Blind all inlets and exits from the equipment being isolated.
17. Attach a blind tag and record the operation on the Blind/ Blank Control List Form.
18. When the job is done, remove all blinds/blanks in the same manner in which they were installed or according to the sequence identified on the Blind/Blank Control List Form and sign off the SWA, Blind/Blank Control List and return the valves and switches to their correct operating position.

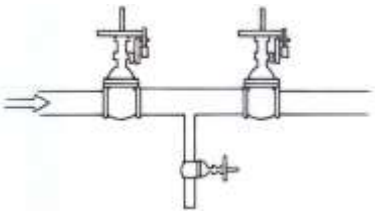
1.9.1 Spectacle Blinds

There are some pipes, equipment, or vessels that are isolated regularly. At these isolation points, spectacle blinds may have been installed at the time of construction.

a) A spectacle blind looks like a figure eight with a hole in one lobe and the other lobe filled in.
b) To install the non-open side of a spectacle blind, loosen the flange bolts and turn the spectacle blind.

1.9.2 Double Block and Bleed

If blinding and blanking is not possible then a double block and bleed process must be used. This involves using a three-valve system where a pipe has two closed valves and an open drain valve positioned between. In the event of a leak of the main upstream block valve the material in the pipe is redirected through the drain valve. If a double block and bleed is used, the following steps must be adhered to:



a) Function test both block valves and lock/tag them in the closed position.
b) Ensure that the bleed valve is of adequate capacity to drain the interstitial space.
c) Lock/tag the bleed valve in the open position. Care must be taken to ensure that the bleed valve is not plugged, hydrated or frozen off.
d) Ensure the bleed valve is piped to a safe place for disposal.

e) For sour operations the venting of the interstitial space must meet applicable provincial regulations.

Note: All devices used to secure valves or seals must have a positive mechanical means of keeping the valves or seals in the required open or closed position. They must be strong enough and designed to withstand inadvertent opening without the use of excessive force, unusual measures or destructive techniques.

1.9.3 Double Block Valves (No Bleed)

If permitted, this is where two valves are closed on each side of the equipment without depressurizing between the block valves. The block valve nearest to the inlet and the outlet of the isolated equipment must be locked and tagged closed.

1.9.4 Single Block Valve

If permitted:

a) Close the inlet valve, the outlet valve and then depressurize and drain the equipment.
b) Verify that the valves hold before work commences. Pressure test or equivalent.
c) Valves must be locked closed and tagged.

1.10 General Safe Work Practices

When isolating, personnel shall proceed as follows:

1. Follow the installation/removal sequence recorded on the Blind/Blank Control List Form.
2. Where a section of line is removed, both ends of the remaining line must be capped or bull plugged. Threaded piping must be disconnected and plugged.
3. If large re-boilers, exchangers, etc. are to be left attached to the space being entered, include them in the isolation preparation procedures.
4. Use engineered line blanks designed for full-line operating pressure, where connecting lines can neither be removed and capped nor blind flanged. Disconnect and blank as close to a confined space as possible. Use the same method for a vessel to isolate vessel jackets, steam coils, bayonet heaters, etc.
5. If connections use unions rather than flanges, the unions must be uncoupled and plugged
6. Ensure installed blinds or blanks do not create any pockets where fluids and/or gases may become trapped and pressure-up or freeze in lines or equipment. This is especially critical in liquid-filled lines.
7. Where isolation is impossible or impractical, develop procedures that are certified by a professional engineer which provide an appropriate and equivalent level of safety and protection to that afforded by isolation.

8. Discharge and/or isolate all other sources of energy (e.g. mechanical, hydraulic, and gravitational) that could affect equipment in the area of the workers.
9. When wellheads are connected to process equipment, isolate the process equipment from the wellhead before work on the wellhead or well bore begins.
10. When isolating out-of-service equipment that is subject to significant cooling or heating, leave an opening to the atmosphere. This will allow for expansion or contraction of the air or gas as the temperature changes without subjecting the equipment to pressure or vacuum.
11. Electrical equipment must be locked out and tagged in accordance with Harvest's Lock-out and Tag-out SOP
12. Cathodic protection must be shut down and flanges bonded prior to installing a blind or disconnecting the piping. Heat tracing should also be shut off on piping.
13. Hydrates and/or plugging may form when depressurizing equipment (refer to the JSA/Critical Task List). Always verify that equipment is depressurized before commencing work.

1.11 Training

Work involving the opening of pressured piping or equipment that contains flammable or toxic hazards shall be done by competent personnel knowledgeable in the following:

a) Hazardous materials found on site.
b) The production/operating process including identification of secondary energy sources requiring isolation.
c) How to safely drain/purge and depressurize the pipe and/or equipment.
d) Installation procedures and requirements of blinds, blanks, plugs, and valves.
e) The appropriate type of PPE required for the task.
f) Have been orientated in this SOP.

1.12 Regulations and References

1. Alberta Occupational Health and Safety Code (2009) Part 15
2. British Columbia Occupational Health and Safety Regulations (2010) Part 9
3. Saskatchewan Occupational Health and Safety Regulations (2007) Part 28
4. ACGIH Standard *Threshold Limit Values (TLV®) and Biological Exposure Indices.*
5. Labour Part 111, NEB

BREAKING LINES

2.0 BREAKING LINES

2.1 Introduction

Breaking open a process line or pressure piping system can expose workers to many hazards such as fire, explosion, high pressure fluids, high temperature fluids and toxic gas.

The Breaking Lines Safe Operating Procedures (SOP) outlines the precautions and procedures that must be followed to safely conduct jobs or tasks that involve the opening or breaking of connections (also referred to as breaking integrity) to process piping containing hazardous products.

2.2 Policy

This Breaking Lines SOP shall apply to all operations or maintenance activities on Harvest's worksites including Production Operations, Drilling, Completions and Construction. Any operational, maintenance or construction-related task that involves opening process or pressure piping and/or equipment must incorporate the minimum requirements outlined in this SOP.

When a job or task is being performed by a contract service (including work on its own equipment), it must be done in compliance with the safety precautions outlined in this SOP. If a contractor has developed its own specific procedures to address a task that is included within the scope of this Procedure, it may be used in its place. If so, the contractor's procedure must comply with applicable legislation and provide an equivalent level of safety and worker protection.

All workers involved in breaking lines must be properly trained in the procedure.

Note: A Management of Change (MOC) process may have been started or is needed for changes to piping.

2.3 Examples of Work Requiring Breaking Lines

Tasks typically addressed by this SOP include opening pig traps, removing meters, installing blinds, separating flanges, or any other work on a process or piping system.

2.4 Responsibilities and Duties

2.4.1 Superintendents, Field Foremen, Lead Operators

a) Ensuring the Breaking Lines SOP and other Procedures (e.g., blanking and blinding) are implemented and followed at all Harvest facilities and worksites under their supervision.
b) Developing Critical Tasks/JSAs and ensuring workers have been properly trained in the procedures.

c) Ensuring relevant training has been provided to workers who are required to supervise breaking lines and/or perform the task of breaking lines.
d) Conducting routine safety checks, inspections, or audits to ensure this SOP are being followed.

2.4.2 Worksite Supervisor and/or Designated Alternates

a) Conducting a site specific orientation & hazard assessment to identify all existing/potential hazards and the necessary controls to eliminate or reduce the risk associated with the work.
b) Identifying any Critical Tasks/JSAs that apply to the job (e.g., Blinding and Blanking and Lock-out and Tag-out) and ensuring workers have been properly trained in these and other applicable Critical Tasks/JSAs.
c) Complete and implement an ERP plan for the task based on risk (refer to the ERP template)
d) Ensuring piping changes, other than piping that is not exact replacement in kind, are approved before being put into service.
e) Making piping change approvals to maintenance/operating personnel if authorized to do so in accordance with the applicable MOC documentation.
f) Identifying all isolation, drain, and vent points on the line or equipment to be taken out of service.
g) Approving the JSA to break or open the pipe connection and recording it on the SWA, if required.
h) Ensuring the pipe is blanked, blinded or plugged according to Harvest's Blinding and Blanking SOP or Critical Task/JSAs.
i) Issuing the proper SWA as appropriate in accordance with the scope of work to be conducted.
j) Checking all isolation points (e.g., mechanical and electrical) prior to commencing the work and verifying that the equipment/piping system is in a "zero" energy state prior to commencing the work (Refer to the Lock-out and Tag-out SOP).
k) Ensuring containment of any and all discharged liquids or gases.
l) Ensuring proper PPE is available and is being used correctly in accordance with the applicable SDS information.
m) After the work is complete, ensuring that all blanks, blinds, plugs, locks and tags have been removed and that all valves and switches have been returned to their original operating position (Refer to the Lock-out and Tag-out SOP).
n) Inspecting the work area and adjacent areas to determine they are in a safe condition.

2.4.3 Workers and Contractors

a) Following all established procedures, Critical Task/JSAs and processes in accordance with the site specific orientation & hazard assessment.
b) Complying with the conditions and PPE requirements in accordance with the applicable SDS and recorded on the SWA.
c) Reporting to the Worksite Supervisor any spills, incidents, and/or unusual conditions which may occur during the work.
d) Refuse to perform work when unsafe conditions exist as defined in Provincial Occupational Health and Safety legislation.
e) Refuse to perform work if not competent to perform the task.
f) Inspect tools, equipment, and PPE for defects
g) Know the location, type and operation of emergency equipment. Fully understand the emergency rescue plan.

NOTE: Stop work if conditions change!

2.5 Training Requirements

Harvest workers whose job responsibilities and duties include breaking lines will receive training on this SOP and must be deemed competent in the applicable Critical Task/JSAs.

2.6 Pre-Job Preparation

2.6.1 Site Specific Orientation & Hazard Assessment

A site specific orientation & hazard assessment specific to the task being performed must be conducted to determine the hazard controls necessary to eliminate or mitigate the potential hazards. Breaking open process lines or pressure piping systems can expose workers to hazards such as but not limited to:

- Fires, explosions or flash fires associated with flammable gases, liquids or vapours (Refer to the Fire and Explosion Hazard Management COP)
- Sources of ignition (e.g., sparking or static electricity, flares, open flame, iron sulphide, and pyrophoric materials, etc.)
- Toxic vapours, corrosive substances, or other contact hygiene hazards
- NORMs
- High temperature fluids and gases under pressure
- Stored energy
- Auto start drivers in system
- Environmental damage due to spills

The Worksite Supervisor will:

a) Complete a SWA to ensure the elimination or control of the identified hazards before the job starts,

b) Review with all the workers and post the emergency response and rescues procedures,
c) Conduct a pre-job safety meeting to communicate the results of the site specific orientation & hazard assessment to those workers who were not directly involved in the site specific orientation & hazard assessment before beginning work or to any new workers that might join the work later

Note: All affected workers must be included in the site specific orientation & hazard assessment and in the control or elimination of those identified hazards. Further, all other workers at the worksite or at other worksites that may be affected must be informed of the hazards and of the methods used to control or eliminate the hazards.

2.6.2 Additional PPE Requirements

Additional PPE required as mandated by the site specific orientation & hazard assessment. Use of additional PPE must be in accordance with applicable codes of practice, Critical Task/JSAs or SOPs and the applicable SDS.

2.7 Safe Work Procedures

2.7.1 Depressurizing the Line or Equipment

The following precautions must be followed whenever depressurizing lines or equipment:

a) Shut down and isolate all sources of pressure (e.g., pumps, compressors, tanks, utility fuel gas systems, stored energy etc.)
b) Isolate and lock-out and tag-out all other energy sources as necessary (e.g., cathodic protection, heat tracing, etc.) on the line to be worked on.
c) Drain product or vent pressure from the line through controlled drain/vent facilities. Ensure hydrocarbon or other flammable products are vented a minimum of 50 metres from any ignition source.
d) Do not vent hazardous gas or liquids to the atmosphere in the vicinity of the workers. Whenever venting hazardous/toxic gases or liquids to the atmosphere, follow the precautions in section 2.7.4 of this SOP Sour Service Equipment Precautions
e) Catch and contain any liquids when draining.

Note: In BC, all purging with inert gas for vessel/confined space entries must first be approved by WCB BC.

2.7.2 Liquid Petroleum Gas (LPG) Lines and Equipment Special Precautions

a) All LPG lines must be water washed whenever hot work repair is required.
b) Lines should be water washed to a tank containing the same product.
c) Lines must be displaced with twice their total volume capacity.

d) Crack flanges or vent points at the highest point possible on the line. If vapours are not present, drain the water.
e) Steam the line from the high point to the low point or as conditions allow ensuring a full purge is achieved.
f) Vent to a safe point at least 50 metres from any source of ignition and into a stand pipe vented vertically upward at least 3.7 metres above ground level.

2.7.3 Purging the Line

Oil or gas lines should be purged with steam, water, or inert gas prior to opening the line and admitting air. Lines suspected of containing iron sulphide should be water washed or purged with inert gas prior to opening.

Note: Critical Task/JSAs and the SOP for purging lines or equipment must be followed. Ensure the potential for off site odors has been mitigated.

2.7.4 Sour Service Equipment Precautions

When the line or equipment to be opened up has been in sour service and the equipment cannot be depressurized or purged with inert gas through a controlled vent, the following precautions must be followed:

a) The venting must be done through a H2S sweetening scrubber unit.
b) All exposed personnel must wear breathing apparatus (Refer to the Respiratory Protection COP).
c) A tending safety watch person must be readily available and in attendance (Refer to the Confined Space COP).
d) The tending safety watch must be equipped with appropriate PPE and monitoring equipment to monitor all potential hazards.
e) Workers shall remain masked up until the lines and/or equipment are proven safe.
f) Consideration for access and egress must be given (refer to the Confined Space COP)

Note:

- In British Columbia: For a confined space entry, a double block and bleed is not permitted if the adjacent piping contains a harmful substance that is a gas, vapour, or liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping (OHS Regulation Section 9.18(b) isolation).
- BC WCB approval is required for alternative methods.

Exemptions to the above sour service equipment precautions will only be allowed for frequently performed operating activities such as pig retrieval, filter change, orifice plate change, or breaking instrument connections without respiratory equipment only if the following controls are in place:

a) Critical Task/JSAs are in place to provide an adequate level of safety for the worker(s).
b) Sufficient investigative testing has been completed and recorded.
c) Worker exposure levels will remain less than exposure limits as per the Provincial Regulations
d) All workers are equipped with proper continuous gas detection and monitoring equipment.

2.7.5 Line Isolation

Proper line or equipment isolation must be achieved before any disassembly, maintenance or repair procedures can begin. Proper isolation must be achieved by using one of the following methods:

a) Installation of blanks or blinds as per Harvest's Blinding and Blanking SOP and/or Harvest's Critical Task/JSA.
b) Use of a double block and bleed procedure under the following conditions:

- Valves used as blocks must be locked in the "closed" position.
- Vent valves must be locked in the "open" position. All vent valves must be vented to a safe location away from workers
- Automated or actuated control valves cannot be used as part of a double block and bleed configuration unless they are checked for a positive seal and can be mechanically locked or pinned in the "closed" or "open" position as appropriate.

Note: Disconnecting the control supply pressure does not meet the intent of a mechanical lock on a control valve.

c) All valves and blinds must be tagged as per the blind tagging procedure in Harvest's Blinding and Blanking SOP or "Do Not Operate" tags must be signed and dated by the worker responsible for isolation of the piping or equipment.
d) Positive isolation must be achieved on all drain points and on all connections to a flare header. All drain isolation valves must be locked and tagged as per the above requirement.
e) For non-flanged connections, the piping must be positively blocked or be equipped with a double block and bleed (see note on previous page for BC restrictions).
f) A flare system shall be considered "live" as long as any of the process or utility piping systems within that facility are in a pressurized state and are connected to the flare system.

g) All connections to a live flare system must be positively isolated whenever breaking lines or connections to prevent air intake into the flare header.
h) The cathodic protection must be isolated (Refer to the Lock-out and Tag-out SOP).
i) All heat tracing should be isolated mechanically or electrically.
j) Where proper isolation of the equipment/line cannot be achieved safely while the affected facility is in operation, the entire facility should be shut down and isolated to provide proper protection.

2.7.6 Breaking, Opening, or Removing Above-Ground Lines

When breaking or opening above-ground process or pressure piping systems and/or equipment, the workers performing the disassembly or maintenance work must:

a) Check all isolation points prior to starting the task.
b) Ensure piping changes are approved before being put into service.
c) A MOC for temporary and permanent piping changes must be completed. Follow the MOC process and have changes approved by a Facility Engineer.
d) Install bonding cables on lines that have carried flammable or combustible products. The bonding cable must be installed across the point of separation.
e) Properly bonded and grounded catch trays must be in place to catch fluids that may be released when separating flanges or piping.
f) Appropriate hazard controls must be implemented to mitigate the risk of injury to workers when separating flanges (e.g., stored energy, fluid release).
g) Monitor for explosive or toxic atmospheres while the work is in progress.
h) Cold cut piping unless it can be verified and ensured the inside of the line and area surrounding the line are gas free.
i) Plug the line if vapours are present using an inflatable plug or bentonite (drilling mud) mud plug.

Note: These plugs will not safely hold any pressure in the line and can only be used if the pressure can be monitored upstream of the plug or if the plug has a pressure measurement tube installed.

j) Clean up any spills and return the line or equipment to service once the job is completed.

2.7.7 Opening or Removing Buried Pipe

When breaking or opening buried process or pressure piping systems, workers performing the disassembly or maintenance work must:

a) Follow the Ground Disturbance and, if applicable, the Confined Space Entry COP's.
b) Ensure the correct line or line segment has been identified and has been depressurized, drained, and purged according to the applicable Critical Tasks/JSAs, SOP's and COP's.
c) If necessary, hot tap the line to control any liquid or gas if unable to verify the line as being depressurized, drained, or purged. This situation may occur in multi-line rights-of-way where it is difficult to identify the correct pipe (Refer to the Hot Tap SOP for details).

2.7.8 Line Repairs

The Worksite Supervisor will ensure:

a) Lines that have not been properly isolated, depressurized or purged must not be left open overnight and they must be blinded and blanked or double blocked and bled.
b) A MOC for temporary and permanent piping changes must be completed. Follow the MOC process and have changes approved by a Facility Engineer.
c) All isolation points and vents are inspected and proven prior to leaving the work area.
d) The work area is barricaded and warning signs are posted.
e) A new hazard assessment and a new SWA may be issued prior to starting work the next day.

BYPASSING SAFETY SHUTDOWN

3.0 BYPASSING SAFETY SHUTDOWN

3.1 Introduction

Under normal operating conditions, safety shutdown systems (whether electrical, pneumatic, or mechanical) should not be bypassed. The piece of equipment should be taken out of service to make the necessary repairs. However, there are situations where it becomes impractical or impossible to work with a piece of equipment without some manner of bypassing or jumping the shutdown system temporarily. These situations can include:

- Maintenance of instrumentation, containment, pressure safety valves, HVAC systems, and gas detection equipment,
- Servicing of the fire protection system, and
- Avoiding a loss of production while repairs to the above are underway.

Note: This procedure is intended for use as a temporary short-term measure only, covering a short period of time. The duration is defined by a risk assessment and/or an approved Bypass Shutdown System Form and recorded on the Safe Work Agreement. Bypass conditions that extend beyond the intent of this Safe Operating Procedures (SOP) must be addressed by the Management of Change (MOC) process.

3.2 Policy

This Bypassing Safety Shutdown Devices SOP applies to all operations or maintenance activities on Harvest worksites including Production Operations, Drilling, Completions and Construction. Any operational, maintenance or construction-related task that involves bypassing safety shutdown devices must incorporate the minimum requirements outlined in this SOP.

3.3 Responsibilities and Duties

3.3.1 Superintendents, Field Foremen, Lead Operators

a) Ensuring this SOP is followed and implemented at all facilities and work sites under their supervision.
b) Approving the temporary removal or bypassing of safety shutdown systems/devices according to site-specific Critical Task/JSA in consultation with the Worksite Supervisor or Safe Work Agreement (SWA) Issuer.

Note: Some complex systems may require a technical review by a specialist before approval is granted by Harvest or the applicable regulatory authority to bypass a safety shutdown system.

c) In consultation with the Worksite Supervisor, identifying which safety shutdown devices can be left unattended for low-risk routine work and

those devices which require a competent worker in attendance at all times to ensure the equipment or process is operating within the design parameters and capacities.

d) Ensuring that Critical Task/JSAs are available at the worksite.
e) Ensuring review of this SOP has been completed by supervisors and workers who are required to bypass safety shutdown devices.
f) Conducting routine safety checks, inspections, or audits to ensure these procedures and other control measures are being followed.

3.3.2 Worksite Supervisor and/or Designated Alternates

a) Ensuring this SOP is implemented and followed at all HOC facilities and worksites under their supervision.
b) Following the applicable Critical Tasks/JSAs and ensuring workers have been properly trained in the approved procedures.
c) Conducting a site specific orientation & hazard assessment to identify all existing/potential hazards and the necessary controls to eliminate or reduce the risk associated with the work.
d) Complete the Location Specific ERP Form and review with all workers
e) Submitting the Bypass Shutdown System Form to the next level of supervision for approval. All bypasses must be approved by the area Foreman, Superintendent, Manager and/or VP depending on the level of risk.
f) Complying with the conditions and requirements recorded on the Bypass Shutdown System Form (Refer to the Forms).
g) Attaching the Bypass Form to the Safe Work Agreement.
h) Ensuring bypassed equipment or process is continuously monitored by a competent person and operating within its designed parameters and capacities, where required.
i) Ensuring proper PPE is being used correctly.
j) After the work is complete, ensuring that all bypassed devices has been returned to their original operating position.
k) Inspect the bypassed equipment or process to determine if they are in a safe operating condition.

3.3.3 Workers and Contractors

a) Following this SOP, applicable Critical Task/JSAs and the conditions on the Bypass Shutdown System form for temporarily bypassing safety shutdown systems and devices.
b) Report any scope of work change, incidents and/or unusual conditions which may occur during the shutdown to the Worksite Supervisor, and stopping the work if necessary.
c) Complying with the conditions and PPE requirements in accordance with the applicable SDS and recorded on the SWA.
d) Refuse to perform work when unsafe conditions exist as defined in Provincial Occupational Health and Safety legislation.

e) Refuse to perform work when they are not competent to perform the task.
f) Inspect tools, equipment, PPE, and safety equipment for defects.
g) Know the location, type and operation of emergency equipment. Fully understand the emergency rescue plan.

3.4 Safe Work Procedures

3.4.1 Site Specific Orientation & Hazard Assessment

A site specific orientation & hazard assessment must be conducted for any job requiring the temporary shutdown of safety systems or devices. Hazards associated with bypassing safety shutdown devices include but are not limited to:

a) Fire and Explosion
b) Changes in operating pressure
c) Hazardous and toxic atmosphere
d) Bypass may defeat safety protection of adjacent systems or the entire facility
e) Interferes with the functionality of protection/operating software and circuits (e.g., PLC)
f) Hydrocarbon / toxic vapour releases or liquid spills
g) Equipment and process operating out of design and manufacturer's specifications

Note: All affected workers must be included in the site specific orientation & hazard assessment and in the control or elimination of those identified hazards. Further, all other workers at the worksite or at other worksites that may be affected must be informed of the hazards and of the methods used to control or eliminate the hazards.

3.4.2 Bypassing a System

When there is no alternative but to bypass a system, proceed as follows:

1. Ensure site specific orientation & hazard assessments, risk analysis, Critical Task/JSAs, Lock-out and Tag-out processes must be completed prior to the bypass of any safety device.
2. Ensure that all lock-out and tag-out positive isolation procedures are followed in accordance with the Lock-out and Tag-out COP.
3. Attach a tag to the bypassed device or associated equipment stating that it is disabled.
4. Notify the control room, adjacent areas and affected worksites when the system is being bypassed.
5. Ensure the bypassed equipment is continuously monitored by a competent person and the appropriate alternate controls are in place for the duration of the bypassed condition. If continuous monitoring is not available then the bypassed equipment must be attended by a competent person for the duration of the bypassed condition.
6. Bypassed devices or systems must be returned to original service once the work is completed and has been deemed safe to do so.

Note: Under no conditions should a safety device be bypassed until all assessments and documentation are completed and proper mitigation controls are in place.

LOCKOUT – TAGOUT (ZERO ENERGY)

5.0 LOCKOUT – TAGOUT (ZERO ENERGY)

5.1 Task Summary

The following is an overview of the Lockout and Tag Safe Operating Procedures (SOP).

1. For work that does **not** require a Safe Work Agreement (SWA) follow individual lockout procedures. Workers must ensure the conditions of the exception still apply to the work.
2. For work that does require a SWA follow this SOP:
   a) The SWA Issuer is responsible for identifying the correct lockout method, conducting a site specific orientation & hazard assessment, holding a safety meeting, and ensuring all energy sources have been identified, locked out, and bump-tested prior to starting the work requiring a lockout.

      Note: All Harvest **Critical Tasks/JSAs**, SOP/procedures **must** be followed.

   b) Identify all sources of energy that must be isolated and their isolation points.

      Important: More than one energy source (electrical, mechanical, or other) may be present.

   c) Identify the equipment that is to be taken out of service and shut down using normal procedures (e.g., depress stop button, open toggle switch, etc.)

   d) Attach the lock(s) and tag(s) using the correct lockout procedure to the isolation point and each worker **must** keep control of the key(s) in their possession at all times

      Note: The SWA Issuer **will always** attach the first lock and tag.

   e) Bump-test the equipment's local start/stop switch or by some other appropriate and effective means to verify that it has been correctly isolated

   f) Ensure all locks are tagged with the printed name and signature of the person who performed the lockout, the date, time, and reason for the lockout

   g) Complete the Group Lockout Log which must be posted next to the lock box.

   h) The SWA Issuer or their designate may remove a worker's lock

   i) Once the locks have been removed restore energy to the equipment and return it to normal operations. Recheck equipment to ensure it is operating properly and safely.

      Note: The SWA Issuer **will always** remove their lock last.

   j) The SWA Issuer must ensure an effective transfer of control when there is a crew or shift change

   k) Procedures are included for Remote Control and Non-Electrical Equipment

Primary Hazard: Unexpected release of energy (i.e., electrical, thermal, chemical, kinetic and potential)

Required Forms, Checklists & Attachments	Harvest Operations Reference Documents
1. Safe Work Agreement	1. Safe Work Agreement COP
2. Alberta/Saskatchewan Lockout Log	2. Blinding and Blanking SWP
3. British Columbia Lockout Log	3. Fire and Explosion Management COP

5.2 Introduction

The Lockout and Tag Safe Operating Practice (SOP) applies to all workers and contractors working at Harvest (Harvest) worksites. Any task that involves a lockout and tag must incorporate the minimum requirements outlined in this SWP. ALL energy isolation activities must involve and be approved by the operating authority.

This SOP also describes the lockout and tag procedures necessary to prevent the unexpected start-up of machinery or release of energy, toxic gases, or liquids.

5.3 Application

5.3.1 This SOP applies to the following:

1. **Equipment that must be repaired, serviced, or maintained during normal production operations.**
2. **When a worker is required to do one of the following:**

    a) Remove or bypass a guard or any other safety device.
    b) Place their body or any others in an area around equipment where an accidental release of energy or equipment activation could result in personal injury.

3. **A complex group process** is a procedure-based “group lockout” process that is implemented when circumstances, such as a plant turnaround, make “group lockout” impractical but **must** be approved in Alberta by the Director of Inspection, in BC by the WCB, and in SK by OHS. When multiple workers are involved or multiple energy isolating devices must be secured, a group process can be used. For example, securing by a group can be used when ten workers are working on a project that requires four energy isolating devices to be secured in order for the work to be done safely.

5.3.2 This SOP does not apply to the following:

1. Activities that meet all of the following criteria:

a) A site specific orientation & hazard assessment or task analysis has determined that there is no risk of injury to the worker or other workers nearby, if normal safe work procedures are followed.

Note: The site specific orientation & hazard assessment must consider previous incidents.

b) If the site specific orientation & hazard assessment determines that the task is anything other than low risk a **Critical Task/JSA** must be prepared that is understood and applied by all workers.

c) A Harvest Superintendent, Worksite Supervisor and a competent worker (e.g., electrical engineer, instrumentation technician, or electrician) **must** approve the Critical Task/JSA.

2. Work on equipment that is connected to a energy source via cords, hoses, jumper cables etc. (includes quick release air or hydraulic lines) that meet all of the following criteria:

a) Unplugging the equipment results in complete isolation from **all** energy sources.

b) The plug is under the exclusive and immediate control of the worker at all times, and is kept in sight and within easy reach so no one else can plug in the equipment.

c) If a worker leaves the equipment unattended without it being locked out and the work is incomplete, the worker must verify that the plug is disconnected from its electrical supply before work resumes on the equipment. The worker must then follow steps (a) and (b) as described above. To prevent the device from being inadvertently used by others the worker in control must place a “out of service” tag on the equipment.

5.4 Responsibilities and Duties

5.4.1 Superintendents, Field Foremen, Lead Operators

Superintendents, Field Foremen, Lead Operators are responsible for:

a) Ensuring the Lockout and Tag SOP is being followed at all Harvest facilities, worksites and locations under their supervision.

b) Hiring a contract specialist to perform the duties of Safe Work Agreement (SWA) Issuer for supervising the lockout requirements on (i.e., large projects or complex systems).

c) Ensuring that lockout and tag equipment is available as required.
d) Approving the type of work permitted for each lockout method or when a lockout or the use of an energy-isolating device is not required (i.e., work on corded or plugged equipment).
e) Initiating disciplinary action for those workers or contractors who leave the worksite without notifying the SWA Issuer that, results in uncertainty regarding the status of their lock and tag.
f) Ensuring that contractor service provider's have lockout and tag procedures in conjunction with Harvest standards.
g) Must approve the contractor's lockout and tag procedures if they are to be implemented in place of Harvest procedures.
h) Ensuring workers who are required to supervise or perform lockouts have received formal training and orientation to this SOP
i) Conducting routine monitoring of **Lockout Logs** and equipment checks.
j) Conducting routine safety checks and inspections to ensure the Lockout and Tag SOP is being followed.

5.4.2 Worksite Supervisor and/or Designated Alternates

The Worksite Supervisor is responsible for:

a) Ensuring the Lockout and Tag SWP is implemented and followed at all Alberta Harvest facilities and worksites under their supervision.
b) Following the Lockout and Tag **Critical Tasks/JSA** (AB, BC & SK) for **equipment that is connected to a energy source via cords, hoses, jumper cables etc. (includes quick release air or hydraulic lines) and ensure** workers have been properly trained in the approved procedures.
c) Undertaking the responsibilities and duties of the SWA Issuer, if so designated.
d) Ensuring that lockout and tag equipment is available as required.

5.5 Safe Work Agreement Issuer

The Safe Work Agreement (SWA) Issuer is responsible for:

a) Conducting a site specific orientation & hazard assessment to ensure potential hazards associated with locking out equipment and energy sources are identified, communicated to workers, and control measures are in place.
b) Following any Lockout and Tag **Critical Tasks/JSAs** (AB, BC & SK) or other applicable Harvest safe work procedures and ensuring workers are competent and have been properly trained in the approved procedures.
c) Deciding which lockout method will be used for the job and ensuring that the worksite has an appropriate supply of locks/tags and lock boxes as needed.
d) Deciding which type of energy-isolating device will be used (e.g. locks, blocks, clamps, pins, chains, etc.). If required, tradespersons shall be engaged to perform the isolation (e.g., a certified electrician to disconnect wires, remove fuses or operate breakers).

Note: Where equipment cannot be locked out due to its design, the SWA Issuer and/or a professional engineer will ensure that a Critical Task/JSA is developed that effectively ensures the energy remains isolated.

e) Assess the impact of activating the energy-isolating device on any system or equipment other than the equipment to be worked on.
f) Ensure interlocking systems are **not** involved and equipment is protected against this type of operational start-up.
g) Attaching the **first** lock in a group lockout.
h) Identify the person who will be the Safe Work Agreement (SWA) Receiver.
i) Designating a Safety Watch to perform watch duties, if required
j) **In British Columbia,** designating a competent worker who must independently attach a second lock to each energy-isolating device when using a group lock box.
k) **In Alberta, BC and SK**, the SWA Issuer **must** always be the last person to remove their personal lock from a hasp, scissor or group lock box.
l) Ensuring all aspects of the lockout are addressed and recorded on the SWA, if a SWA is issued.

Note: In most situations, the SWA will be issued for the primary task (i.e., hot work, cold work, vessel or confined space entry, etc.).

m) Ensuring workers conducting work that involves energy isolation (lock out and tag) have individually assigned keyed padlocks and tags
n) Ensuring workers understand that it is a legal requirement to retain control of the key(s) for the lock(s) they attach.
o) Checking all isolation points (i.e., mechanical and electrical) prior to commencing the work and verifying ("bump test") that the equipment/piping system is in a "zero" energy state prior to commencing the work.
p) Inspecting all locks and tags prior to signing off the **Lockout Log**.
q) Ensuring the **Lockout Log** is completed and attached to the SWA for the primary task.

Note: A Lockout Log, Board, or some similar method must be used by the contractor or the persons responsible for conducting the lockout.

r) Ensuring workers wear and use the necessary personal protective equipment (PPE) correctly.
s) Advising affected workers in adjacent work areas or other worksites that the work area and/or equipment has been removed and returned to service.
t) Once the work is complete, reconcile the lock out log to ensure that all locks and tags (includes blanks, blinds, flow-stopping tools, and plugs) have been removed and the valves and switches have been returned to their original operating position.

u) Inspecting the work area and adjacent areas to determine they are in a safe condition; monitoring the worksites for compliance; and implementing corrective action when required.

5.5.1 Safe Work Agreement Receiver

The Safe Work Agreement (SWA) Receiver (i.e., Crew Leader) is responsible for:

a) Following this SWP, Critical Task/JSA and the lockout method determined by the site specific orientation & hazard assessment and approved by the SWA Issuer.
b) Following the instructions of the SWA Issuer in performing the lockout.
c) Reporting to the SWA Issuer any spills, incidents, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

5.5.2 Workers

All workers (includes contractors) are responsible for:

a) Following this SWP and the lockout method determined by the site specific orientation & hazard assessment and approved by the SWA Issuer.
b) **Not** working on any equipment that has not been properly isolated, locked and/or tagged out, adequately immobilized, or rendered inoperative.
c) Following the instructions of the SWA Issuer and SWA Receiver.
d) Attaching their individually assigned padlocks securely to the isolation device with an identifying tag and **keeping control** of the key(s) (in their possession) at all times or in a lock box if a group lockout procedure is in place and recorded on the safe work agreement.
e) Informing the SWA Issuer and SWA Receiver and/or the Worksite Supervisor of their intention to remove their lock and tag and or if they leave the worksite.
f) Before work begins, check/bump test the equipment with the SWA issuer to ensure that it is properly isolated and or rendered inoperative.
g) Complying with the conditions and personal protective equipment (PPE) requirements recorded on the SWA.
h) Reporting to the SWA Issuer, Receiver and or Worksite Supervisor any spills, incidents, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

5.6 Definitions

Competent, in relation to a person, means adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Energy means electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravitational, or any other form of energy that could cause injury due to the unintended motion, energizing, start-up or release of such stored or residual energy in machinery, equipment, piping, pipelines or process systems.

Energized means connected to an energy source or a source containing stored or residual energy.

Energy-Isolating Device means a device (i.e., disconnect switch, circuit breaker, valve, or block) that can be operated or put into place to prevent the transfer of energy from one side of a device to the other side of the device. Push buttons, selector switches and other control circuit-type devices are not energy-isolating devices for purposes of this SWP.

Isolation Point means the point (i.e., disconnect switch, circuit breaker or valve) at which an energy-isolating device is attached to the equipment, with the capability of having a lock installed, or in the case of flow-stopping tools (i.e., line stopper tools, pipe squeezers), to prevent the flow of oil or natural gas within the pipeline.

Individual Lock means a lock for use by an affected worker to ensure personal lockout protection such that each lock when applied is operable only by a key in the worker's possession.

The Operating Authority is the individual to whom Harvest has delegated immediate control and accountability for all operations on a specific worksite.

5.7 Overview of the Types of Lockout/Tag Methods

The following includes a definition of lockout and tag and an overview of the different types of lockout methods permitted.

Lockout: is the use of locks, cables, chains, bars, blocks, pins, or clamps to render machinery or equipment inoperable and to isolate an energy or product source. The purpose of a lockout is to:

a) Prevent the release or transmission of energy or product.
b) Prevent a product or energy-isolating device (such as a switch, circuit breaker, or valve) from accidentally or inadvertently being operated while workers are performing maintenance or service on the machinery or equipment.

c) Ensure the locked-out equipment is effectively secured in the **off** or **safe** position and is sufficient to prevent activation of the device or removal of the lock without the use of tools. The securing device (lock) or mechanism (cable with lock) must be strong enough to withstand inadvertent opening without the use of excessive force, unusual measures, or destructive techniques (i.e. metal cutting tools).

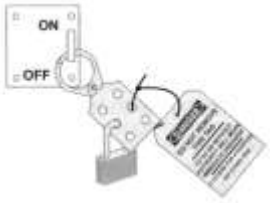
Note: For example, a wooden or metal rod placed in a valve handle, or duct tape across a circuit breaker or a sign placed above a box containing fuses that have been removed from an electrical panel are **not** permitted.

Tag is the placement of a warning tag attached to a locking device, to a gas system component, or to a flow-stopping tool identifying the worker who attached the lock and the time and date of attachment.

5.7.1 Individual Lockout (single worker)

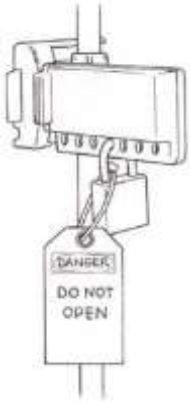
The energy-isolating device (i.e., disconnect switch, circuit breaker or valve) that is to be locked out must be under the exclusive control of the worker and must completely de-energize and deactivate the machine or equipment.

5.7.2 Group Lockout Using Scissors or Hasp



In the case where more than one worker is working at the **same** isolation point, each worker must attach their keyed padlock and tag to the energy-isolating device. The Safe Work Agreement (SWA) Issuer will attach their padlock/tag **first** and then verify, on behalf of all workers, that the energy source has been effectively isolated.

5.7.3 Group Lockout Using a Lock Box



A group lockout procedure may be used if a number of workers are working on machinery or equipment at the same time; particularly, if a large number of energy-isolating devices must be locked out.

In this case, the Agreement Issuer is assigned the responsibility of placing and/or activating the energy-isolating devices (turning off switches, valves, etc) and then attaching the locks/tags, test and confirm isolation and place the keys in a lock box which is then locked and tagged by all workers.

Note: Harvest's Alberta, BC and SK **Critical Task/JSAs** must be followed.

In British Columbia, there **must** be a second competent worker who will independently attach their lock/tag to the energy-isolating devices. The SWA Issuer and second competent worker will perform a bump test to ensure that the energy is properly isolated, locked out, and cannot reach the work area.

A **Group Lockout Log** must be in place at the lock box describing what, how, and where isolation and lockout have been done and specifying which workers have applied locks/tags to the group lockout box.

5.8 Pre-Job Preparation

To minimize the potential for injury, proper isolation steps are critical during the lockout and tag of equipment and/or sources of stored energy or hazardous products. Personnel must adhere to these requirements to safely isolate equipment or other sources of hazardous energy:

- Site Specific Orientation & Hazard Assessment
- Notification of Affected Workers
- Pre-job Safety Meeting
- Safe Work Agreement
- Group Lockout Log
- Lockout Equipment and Tags
- Flow-Stopping Tools
- Equipment and Machinery Shutdown

5.8.1 Site Specific Orientation & Hazard Assessment

There may be more than one energy source (electrical, mechanical, or other) or source of hazardous products (H_2S, CO) present. Proper identification ensures that all sources are isolated or controlled prior to starting service or performing maintenance work.

Potential hazards to personnel which must be considered in the site specific orientation & hazard assessment include but not limited to:

- Entanglement with or being struck by activated mechanical equipment
- Injury as a result of an uncontrolled pressure release of substance or stored energy
- Electrocution from energized electrical sources or equipment
- Burns from uncontrolled ignition of combustible gas mixtures
- Exposure to carcinogenic substances (e.g. NORMS, Asbestos, Benzene)
- Poisoning from exposure to toxic gases or asphyxiation from oxygen deficiency
- Drowning from flooding in a workspace

Note: All affected workers (i.e. the work crew) **must** be included in the site specific orientation & hazard assessment and in the control or elimination of those identified hazards. Further, all workers at the worksite or at other worksites affected by the lockout or hazards identified in the site specific orientation & hazard assessment and Safe Work

Agreement (SWA) **must** be informed of the lockout, the hazards and of the methods used to control or eliminate the hazards.

5.8.2 Notification of Affected Workers and Contractors

Other workers in the work area or at **other** worksites who may be affected by the shutdown or isolation of an energy source (production or storage equipment) **must** be notified of the intent to lock out a specific energy/product source for a specified time period prior to commencing the lockout.

5.8.3 Pre-job Safety Meeting

Prior to completing the lockout, the Agreement Issuer will hold a pre-job safety meeting with all workers or contractors involved in the work. Topics of discussion specifically related to lockout and tag will include:

a) Identifying workers or contractors involved with the work or other work locations affected by the lockout or by the use of flow-stopping tools.
b) Identifying the energy-isolating devices associated with the work.
c) Deciding on the type of lock (may also include using blocks, pins, chains, bars or clamps) that will be attached to each energy-isolating device.
d) Recording the lockout sequence on the Lockout Log, if required
e) Reviewing all the aspects of the lockout, the Critical Task/JSA, the hazards/controls, and verification/bump test procedures to be used for the work.
f) Reviewing the information to be recorded on the lockout tags.
g) Verifying the lock removal (including emergency removal) procedure.
h) Reviewing and confirming other concurrent lockouts at the worksite.
i) **Confirming that no worker** who has locked out an energy-isolating device or a lock box will be allowed to leave the worksite without receiving permission from the SWA Receiver and SWA Issuer.

5.8.4 Safe Work Agreement

A Safe Work Agreement (SWA) is required for all work where a lockout will be used to isolate an energy or product source. The SWA must indicate whether a contractor's or Harvest's lockout and tag procedure is to be used. If a contractor's procedure is to be used, it must be approved by the Superintendent, Field Foreman, Supervisor, and/or Designated Alternate. . The SWA, Critical Task/JSAs, and lockout log must be conspicuously posted at the worksite or lock box so it's available for review for the duration of the lockout.

In most situations, a SWA will be issued for the primary task such as construction, repairs, or maintenance that requires electrical power, equipment or a piping system to be locked out and in a "zero" energy state prior to commencing the work.

If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.

Where a lockout extends beyond the time limit established by the SWA, the retained lockouts will be noted on the SWA.

In British Columbia, if a lockout involves two or more power systems, or two or more persons in charge of different parts of a system, appropriate written procedures must be established and followed to ensure that any lockout will be effective.

Further, a site specific orientation & hazard assessment must be conducted to ensure a worker is not exposed (i.e., work in Confined Space or cold weather) to levels that exceed those listed in the screening criteria for heat or cold stress exposure ACGIH Standard *Threshold Limit Values (TLV®) and Biological Exposure Indices.*

In Saskatchewan the hazard assessment must comply with Section 70 *Thermal Conditions* in Saskatchewan's OHS Regulations. For additional information refer to Harvest's **Heat and Cold Stress** SOP.

5.8.5 Group Lockout Log

In addition to the Safe Work Agreement (SWA), a Lockout Log listing the location of all lockouts and/or personnel participating in the group lockout must be completed.

The Group Lockout Log must be kept by the group lockout box and be available for review and updating with workers who apply their locks on the group lockout box. The Lockout Log makes it easier for the SWA Issuer and SWA Receiver to review the required information with workers, especially those who arrive later. It also helps to minimize the chances of accidents occurring.

5.8.6 PPE Requirements

- CSA-approved hard hat, safety glasses or face shield, and safety footwear
- SCBA or SABA respiratory protection equipment (as required)
- Fire-resistant clothing (FRC)
- Personal gas monitor
- Other PPE identified during the site specific orientation & hazard assessment and recorded on the SWA.

5.8.7 Lockout Equipment and Tags

a) Each worker participating in a job requiring a lockout must have their own individual lock(s). Combination locks are **not** permitted.

b) A lock must be traceable back to the worker who owns it and or installs it. Locks are traceable in at least two ways:

1. Bearing a marking unique to each worker (e.g., engraved name, identification code, colour code, symbol code), or
2. Incorporating an identification tag that identifies the worker to whom the lock is assigned. If this method is used, the tag must be secured to the lock in such a way that the tag cannot fall off.

c) Duplicate keys for each lock will be kept under the direct control of the SWA Issuer or Worksite Supervisor. The use of a duplicate key or cutting off a lock must be noted in the Lockout Log and follow the written procedures as noted in section 1.13 Lock Removal Authorization

In Saskatchewan, the use of duplicate keys and the reasons for that use must be recorded in the Group Lockout Log.

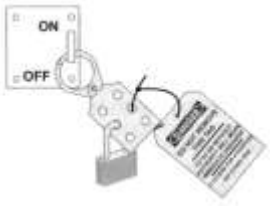
d) Lockout devices such as metal chains, cables, blocks, or bars can be used to positively isolate several isolation points located in one area once they are placed in the “off” or “safe” position. These devices must be locked in place to prevent their removal.

e) The locking devices must **not** prevent access to other energy-isolating devices (i.e., circuit breakers) supplying machinery or equipment that could cause injury to workers.

f) Lockout tags (i.e., **Do Not Operate**) must be attached or be conspicuously located adjacent to each lock applied at a lockout point or to a lock box. The tag must bear the name of the worker who installed it, the date and time of installation, the reason for the tag, and the type of lockout method used (e.g. individual, multiple or group), all written legibly in waterproof ink.

Note: A tag by itself, duct tape, or cardboard signs **must never** be used to isolate an energy or product source.

g) Approved contractors must have their own lockout and tag procedure and devices. In the absence of a specific procedure, the Harvest lockout and tag procedures must be followed.



Example of Locking Out and Tag

5.8.8 Flow-Stopping Tools

Flow-stopping tools mean portable tools used to prevent the flow of natural gas and include line stopper tools and pipe squeezers.

a) When a flow-stopping tool is installed, the SWA Issuer must notify the other work locations which are affected by this action.
b) When the information or instructions related to starting or stopping the flow of natural gas are communicated by telephone or radio, all involved parties must use their full name for certainty of identification and must repeat the information and instructions back to the originator to ensure they are clearly received and properly understood.
c) Where the safe execution of the work relies on continuous or scheduled communication with the other parties who have on-site responsibility and such communication fails or cannot be maintained, all work must be suspended until effective communication is re-established.

5.8.9 Equipment or Machinery Shutdown

Equipment to be taken out of service will be shut down using normal procedures (e.g., depress stop button, open toggle switch, or close valves). When all machinery has completely stopped, the energy or product sources (e.g. locking off electrical power, eliminating oil/natural gas energy, blocking or pinning movable parts, venting pressure, bleeding hydraulic lines, or releasing spring energy) must be isolated according to the lockout method selected during the site specific orientation & hazard assessment. Push buttons, selector switches and other control circuit-type devices are **not** energy-isolating devices.
Note: A voltmeter, pressure gauge, or some other instrument, as necessary, must be used to test for a “zero” energy state.

5.9 Attaching Lockout Devices and Tags

5.9.1 Individual Lockouts (for approved low-risk tasks)

1. A worker must conduct a site specific orientation & hazard assessment to determine if the task can be completed as an individual lockout (single worker). The results of the site specific orientation & hazard assessment must determine the task to be “low risk work” to be considered individual lockout (single worker).
2. The worker will attach their keyed padlock(s) and tag(s) to all energy or product sources (i.e., breakers, switchboxes, valves and controls).
3. Each lock used must be accompanied by a tag that is signed and dated.
4. The worker who has attached their padlock/tag is responsible for testing and confirming that the energy source(s) has been effectively isolated and a “zero” energy state exists.
5. Working alone procedures must be followed.

5.9.2 Group Lockout Using Scissors or Hasp

1. The Safe Work Agreement (SWA) Issuer will attach the first lock and tag to the energy-isolating device (includes the use of flow-stopping tools) at the isolation point by some approved method.
2. The SWA Issuer must then **test and confirm**, on behalf of all workers, that the energy sources have been effectively isolated and or dissipated, and a "zero" energy state exists.
3. Each worker is then responsible for attaching their own padlock and tag to the lockout scissors. The number of locks used at the isolation point must equal the number of workers affected by the isolation.
4. When the work is completed, the SWA Issuer will be the **last** person to remove their lock/tag from the lockout scissors at the isolation point.

5.9.3 Group Lockout Using a Lock Box

The SWA Issuer is assigned the responsibility of placing and/or activating the energy-isolating devices (turning off switches, valves, etc). The SWA Issuer must then:

1. Place a securing device (typically a lock) and tag on each energy-isolating device.

In British Columbia: The SWA Issuer will designate a competent worker who must independently attach a lock/tag on the same energy-isolating device.

2. Test and confirm lockout, and document that all hazardous energy sources in the group lockout situation are effectively isolated.

In British Columbia: The designated competent worker will also test/confirm lockout.

3. Put the key(s) to each securing device in a lock box and attach their personal lock and tag.

In British Columbia: The competent worker will also attach their lock and tag.

4. Each worker involved in the work then attaches their own lock and tag to the lock box, thus ensuring that the master key(s) preventing the equipment from being returned to service cannot be removed from the group lock box until each worker removes their personal lock and tag.
5. Complete, sign, and post a Lockout Log identifying the machinery or equipment included in the procedure.

5.9.4 Lockout/Tag of 120/208 V and 120/240 V Lighting Panel Circuit Breakers

Prior to the work being done a Critical Task/JSA that has been approved by a qualified electrical person must be developed for use in all similar cases in the particular operation.

There are several ways to assure lockout and tag of lighting panels:

a) Obtain lockout devices from safety supply houses. Most have universal lockout attachments, but some have brand-specific devices which are more convenient than universal models; there are also small devices now in use in the field that enable an electrician to attach to and lock out individual breaker switches. This allows a conventional lock and tag to be placed on the individual breaker.

b) Racking out or removing a circuit breaker and verifying absence of voltage is **not** an acceptable practice. A competent electrician will remove the wire from the load side of the breaker, tape off and tag as to identify reasons for isolation. A Safety Watch will be posted.

c) Except for when the panel is only controlling that piece of equipment requiring lockout, locking panel doors is **not** permitted as a panel door lock will prevent access to other circuit breakers not included in the lockout which may have to be switched off during an emergency.

d) Locking the room where the panel is located or assigning a Safety Watch to prevent access to the room is **not** an acceptable method, as this may present a lack of accessibility to other facilities by workers.

e) If an electrical utility is involved, coordinate with them to ensure there is no chance of unexpected energizations and obtain a “Guarantee of Isolation” from the utility lineman. Observation or witness of voltage readings and “zero” energy state will be carried out by Harvest personnel or a representative.

5.10 Lockout Test and Verify Energy Isolation

Prior to starting work, the Safe Work Agreement (SWA) Issuer will ensure the machinery or equipment has been de-energized and the energy-isolating devices have been rendered inoperative. This is often referred to as a “bump” test, and it usually involves activating the control switches and then listening to and watching the equipment.

In Saskatchewan, the locks attached to double block and bleed valves must be monitored by a designated worker who will record the date, time and their signature on the tag each time the locks are checked. This requirement will be completed every 1 hour by the SWA Receiver or as designated by the SWA Issuer and recorded in the SWA.

In British Columbia: A double block and bleed is **not** permitted if the adjacent piping **contains** a harmful substance that is a gas, vapor, or liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping. Further, except when used in an acceptable double block and bleed system, the closing of one or more valves in a line is **not** an acceptable means of isolation.

Note: Harvest expects its workers to refuse work on any equipment until it has been bump tested successfully and the SWA Issuer is **certain** that it is safe to proceed with the work.

5.11 Proceed with the Assigned Task

When energy isolation or a "zero" energy state of the equipment is confirmed, the necessary service or maintenance work can be performed in accordance with the terms of the SWA, if issued.

When the SWA Issuer transfers authority for an area, facility, or work location to another person, responsibility for the lockout and tag devices must also be transferred (see Shift or Crew Changes).

5.12 Placing Equipment Back into Operation

Before removing the locks and returning the equipment back to service, the SWA Issuer must proceed with the following steps:

1. Ensure that all tools and spare parts are removed and all personnel are accounted for.
2. Ensure all equipment guards are properly replaced.
3. Notify all workers (includes other affected workers and worksites) of the intention to restore energy to the equipment by removing the energy-isolating or flow-stopping devices.
4. Confirm that no worker will be endangered when the energy-isolating devices are removed and the equipment is returned to service.
5. Ensure the work area is left in a clean and safe condition.
6. Return any lockout equipment and unmarked tags to their designated storage area.

For **individual lockouts:** once the lock and tag have been removed, the worker or the operating authority as indicated on the turn over agreement and or SWA, will return the equipment or machine back to normal operations.

For **group lockouts using scissors or hasps:** once the locks of the individual workers have been removed, the Safe Work Agreement (SWA) Issuer must:

1. Inspect the work to ensure the equipment is safe to operate before removing their lock and locking device from each isolation point (if applicable, according to sequence).

2. Remove any blinds/blanks, flow-stopping tools, pins, blocks, clamps, etc.
3. Ensure the same electrician, if available, or some other qualified person returns the electrical panels, circuits, batteries, etc. to normal operations.
4. Return the equipment or machinery back to normal operations.
5. Ensure that bypassed safety shutdown systems and process software are returned to normal operations.

For **group lockouts using a lock box:** the SWA Issuer will inspect the completed work to ensure the equipment is safe to operate. If so, the SWA Issuer will:

1. Have all locks removed from the lock box.
2. Remove the locks and other securing devices (if applicable, according to sequence).
3. Confirm that all locks listed on the Lockout Log are accounted for.
4. Follow the procedure list above for returning back to normal operations.
5. Advise workers or other worksites involved with or affected by the lockout of the final status of the equipment and the return of equipment or machinery back to normal operations.

Note: For work that required a SWA, the SWA Receiver will then return their copy of the SWA to the SWA Issuer.

5.13 Lock Removal Authorization

The SWA Issuer may cut off and remove a worker's locking and tag device(s) if all the following conditions are met:

a) The worker **is** unavailable or cannot be contacted to remove the locking and tagging devices when the work has been completed and it becomes necessary to restart the equipment.
b) Reasonable attempts have been made to contact the worker, and these attempts have been unsuccessful, but they are documented.

Note: A worker must be notified at the start of their next shift, if the worker's personal lock(s) has been removed since their previous shift.

c) The SWA and site specific orientation & hazard assessment have been reviewed and the site has been inspected to verify that the equipment is safe to operate.
d) All affected workers have been notified.

5.14 Shift, Crew Change, and Handover Procedure

a) The outgoing SWA Issuer **must** review the Safe Work Agreement and **all** aspects of the lock out with the incoming SWA Issuer. A new site specific orientation & hazard assessment, safety meeting and SWA is required.

b) The outgoing SWA Issuer Identifies the location and types of all isolation points with the incoming SWA Issuer.
c) The outgoing SWA Issuer ensures that each outgoing worker removes their locks and tags.
d) The outgoing SWA Issuer ensures an effective transfer of control by removing their padlock from the lock box or hasp only after the incoming SWA Issuer attaches their padlock to the lock box or hasp.
e) The incoming SWA Issuer ensures the incoming workers install their locks and tags as required.
f) Workers in adjacent work areas affected by the lockout must be notified by the new SWA Issuer.

5.15 Remote Control Systems

Supervisory Control and Data Acquisition (SCADA) and automatic operated equipment that are activated with power, gas, air, hydraulics or electrical power are not considered “locked-out” unless:

a) They are rendered inoperative by physically disabling or disconnecting the control medium.
b) They are locked out and tagged at the control point.
c) The automatic operated equipment may be required to be physically made inoperative at the equipment.
d) The equipment must be bump tested to ensure it is isolated and de-energized.

5.15.1 Solenoid Systems

Solenoids and electrical assist devices are not considered locked out or fail-safe unless:

a) Electrical power supply is disconnected;
b) Hydraulic, air, gas or other control medium is completely disconnected or energy dissipated (mandatory).

This will ensure that leakage through a solenoid device will not activate end device.

5.16 Locking Out Non-Electrical Prime Movers

Note: Additional information on lockout is found in the manufacturer’s specifications and maintenance manuals.

5.16.1 Prime Movers Using Starting Air or Fuel Gas

1. Close the starting air/fuel gas block valve and install a lock device.

2. If the prime mover is installed with an air or gas starter, lock out and tag the starter gas/air supply valves as close to the starter as possible., Engage the starter, or bleed off the supply line to the starter before working on the unit.
3. Attach and remove the locks according to the lockout method selected.

5.16.2 Prime Movers Using Batteries to Power a Bendix and Remote Start Units or Automatic Start Units

1. Isolate by disconnecting the battery or other power source and lock out the cable end.
2. Tag local on/off switch-sign, if applicable.
3. Tag remote start switch, if applicable.
4. If it's an automatic start unit, turn the control system to the "off" position; lockout and tag.
5. If necessary post a Safety Watch.

5.17 Blocking, Pinning, or Clamping Hazardous Energy

During construction, servicing, or maintenance of facilities, it may be necessary to block, pin, or clamp equipment (energy isolation) to prevent accidental movement due to gravity, pressure, or friction release once the electrical energy or other energy source has been locked out.

Note: Any one of the following methods will also require locking the energy-isolating device in place and tagging the equipment, restricting access or posting a Safety Watch to protect against unauthorized reactivation of the equipment.

5.17.1 Mechanical Motion (i.e. rotation, linear, oscillation)

a) Remove segments of the operating mechanical linkage such as dismantling push rods or removing belts, and flywheels.

- Tag the linkage and place them in locked cabinets away from the machine.

b) Use wood or metal blocking devices.

- Chain or lock in point of control or use metal pins driven or welded in place.

c) Close hydraulic or pneumatic valves.

- Disconnect pneumatic and hydraulic lines and tag.

Note: Check for residual pneumatic and hydraulic energy and alternate power sources.

5.17.2 Pressure

Close valves and maintain open vent to relieve pressure with vent locked in the open position.

- Secure with block, blind flange, slip blind, or valve with a locking device.

5.17.3 Gravity

If possible, lower the cantilevered beam, counter weight, flywheel, crank shaft, etc. to a point where gravity can no longer cause inadvertent falling.

Block in place by using metal or wood blocks under the mechanism or pin the linkages in a position where gravity will not cause the mechanism to inadvertently fall.

Notes: Gravity includes blocking out a crane or hoist to prevent accidental movement of the machine or load while workers are working on or near the load, or attaching or detaching equipment to a building (i.e., stairs) or machine.

1. At all times the load must be under control (i.e., chains or blocks) until a crane can take over and no worker is under the load.

5.17.4 Springs and Coils

Spring and coil energy may be dissipated by controlled release or dismantling of the mechanism:

- Block in a safe position by pinning or clamping the device eliminating the potential of unrestricted and/or undesired travel.
- Secure pin or clamp in place with a locking device.
- As per manufacturers recommendations dismantle (e.g. straighten) the mechanism (coils)

5.17.5 Thermal

Thermal energy is the energy in heat, which is found in steam, hot water, fire, gases, and liquefied gases. For example, a steam pipe that supplies steam under pressure to drive a turbine has a hazardous thermal energy that requires time to cool down.

a) Close the appropriate valves and maintain an open bleed vent. Chain and padlock valve or use blind flanges or slip blinds.
b) Allow time for residual heat to dissipate.
c) Follow Harvest's Heat and Cold Stress SOP where applicable (i.e., confined spaces).
d) Cold start-up procedures may be required when returning to service.

5.18 Pumping Units

All pumping units consist of heavy rotating parts that can cause death or serious injury to unwary workers if safe standards are not observed when erecting, moving, operating, or maintaining the pumping equipment. Workers in or around pumping equipment must stay clear of stationary or moving components, cranks, and counterweights. Times of particular danger are during installation, stroke and counterbalance change, pumping unit alignment, general unit maintenance, and well servicing operations.

Pumping units and their associated components are utilizing energy to move fluid. A portion of this energy may be stored and not utilized or released as part of the normal operating process. This stored energy is the main hazard where precautions must be taken. While a pumping unit is off, this stored energy may partially drain off as the fluid level or well bore pressure changes. This can be seen when the crank arms slowly move to a new position after the prime mover shuts down.

When locking out a pumping unit; identify all energy sources (i.e., gravity, electricity, pressure, etc.) and secure the unit (cranks, counterweight and brake drum) against accidental movement. When well servicing operations are performed, the unit shall be turned off, the brake set, the weights secured (i.e., blocks, chain), and the master electrical control switch locked out/tagged.

Chains, blocking, locking pins, or other hardware shall be used for isolating, securing, or blocking of machines or equipment from mechanical energy sources. The use of the hand brake on a pumping unit alone is not an acceptable means of isolation.

Note: Additional information on lockout is found in the manufacturer's specifications and maintenance manuals.

5.19 Alberta Regulations and References

1. Alberta Occupational Health and Safety Code (2009) Part 15
2. British Columbia Occupational Health and Safety Regulations (2010) Part 10
3. Saskatchewan Occupational Health and Safety Regulations (2007) Parts 6 and 10
4. Work Safe Alberta - Working Safely in the Heat and Cold (2009)

PURGING

6.0 Purging

6.1 Introduction

Purging is normally employed where it is necessary to eliminate high concentrations of flammable or toxic substances. The choice of purge material such as nitrogen, steam, water, or fuel gas depends upon the process and the availability of the material.

- Facility manuals, manufacturer's instructions and or a JSA will contain detailed procedures for purging specific equipment.
- If a hazardous atmosphere (an explosive mixture of flammable product and air) is created during purging, all sources of ignition must be removed.

6.2 Policy

The Purging SOP may be considered the minimum requirements and additional preparation may be necessary depending on the nature of the equipment.

This Purging Safe Operating Procedure (SOP) is not intended to be a technical step-by-step, "how to instructional" for performing purges on all types of equipment but is intended to be used as a guideline for Worksite Supervisors and workers involved in purging activities.

6.3 Application

Prior to using the following purging procedures, they must be reviewed and approved by Harvest's Safe Work Agreement Issuer. This also includes any purging procedures being used by a contract service provider.

6.4 Regulations and References

The Purging SOP is based on the following Provincial regulations and the manufacturer's specifications. However, Managers and Supervisors must remain knowledgeable and current with industry best practices.

1. Alberta Occupational Health and Safety Code (2009) Parts 5 and 10
2. BC Occupational Health and Safety Regulations (2010) Parts 6, 9 and 23
3. Saskatchewan Occupational Health and Safety Code (2009) Part 18
4. Manufacturer's operating and maintenance specifications
5. Harvest Operations O&M Manual (Pipeline Operations and Maintenance Manual)

6.5 Responsibilities and Duties

6.5.1 Superintendents, Field Foremen, Lead Operators

a) Ensuring the Purging SOP is implemented and followed at all Harvest facilities and worksite locations in their area of responsibility.
b) Ensuring Critical Task/JSAs are developed for purging specific equipment.
c) Ensuring that the hazards of purging are assessed, and controls (e.g. engineering, administrative or PPE) are implemented where necessary.
d) Ensuring training is provided to workers who may have to purge equipment.
e) Conducting routine safety checks, inspections, or audits to ensure purging procedures and/or other control measures are being followed.
f) Ensuring that contractors are approved via the Contractor Engagement system (ComplyWorks).
g) Ensuring adequate documentation (e.g. safe work agreement, fire explosion plan) is prepared and maintained by a competent person.
h) Ensuring that all applicable codes of practice and safe operating procedures are readily available at the worksite (e.g. flash drive).
i) Ensuring those Harvest Worksite Supervisors that are issuing Safe Work Agreements for purging are appropriately orientated and trained in accordance with Harvest's orientation and training requirements (refer to the Orientation and Training section).

6.5.2 Worksite Supervisor and/or Designated Alternates

a) Ensuring the Purging SOP is implemented and followed at all Harvest facilities and worksites under their supervision.
b) Following any applicable Critical Task/JSAs or the manufacturer's procedures that apply to the job and ensuring workers have been properly trained in these procedures.
c) Conducting a site specific orientation & hazard assessment to ensure potential hazards associated with purging are identified, communicated to workers, and control measures are in place. All ignition, oxygen, and fuel sources must be identified and isolated to achieve a zero energy state.
d) Holding a pre-job safety meeting and addressing all aspects of the purging operation and issuing a Safe Work Agreement (SWA).
e) Ensuring compliance with all government regulations and industry best practices.
f) Reviewing the Safety Data Sheet (SDS) and follow the requirements.
g) Ensuring PPE is being properly worn and used.
h) Ensuring workers are trained in this SOP and other Critical Task/JSAs required for purging operations.

6.5.3 Workers

a) Complying with the Harvest Purging SOP.
b) Following this SOP and the procedures determined by the site specific orientation & hazard assessment and approved by the Worksite Supervisor.

If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.

6.6 Hazards

Hazards associated with purging include but not limited to:

- Fire or explosion from purged gases
- Suffocation in oxygen-deficient atmospheres
- Trapped Pressure
- Purge speed velocity under low pressure
- Burns/scalding
- Toxic material
- Ergonomics
-

6.7 Additional PPE Requirements

- Dual hearing protection as required.
- Self-contained breathing apparatus (SCBA) or supplied air breathing apparatus (SABA) must be worn when opening vessels under a nitrogen purge or when toxic gases are suspected or present.
- Gas detection device
- As per SDS

6.8 Signage

When purging vessels that will affect the atmosphere around the vessel, appropriate signs must be posted to warn workers of the hazards present. These signs must be posted a minimum of 25 metres from the vessel.

6.9 Site Specific Orientation & Hazard Assessment

In all cases, a site specific orientation & hazard assessment will be completed and a safety meeting held.

Note: All identified hazards must be communicated to other affected workers.

6.10 Safe Work Agreement

A Safe Work Agreement (SWA) will be issued for the work being carried out.

For all high risk work preformed a JSA will be required (e.g. purging, start up, return to service procedure).

6.11 Purging Overview

Purging means removing the unsafe atmosphere from an enclosed system and replacing it with an acceptable medium.

Purging is normally employed where it is necessary to eliminate high concentrations of flammable or toxic substances. Steam, sweet gas, or an inert gas such as nitrogen are the usual choices.

Caution must be exercised to prevent damage to the equipment.

a) In purging with steam, the normal procedure is to provide low-pressure steam near the bottom of the space or vessel and allowing it to vent off the top.
b) Sweet gas, when used for purging, is usually introduced near the top of the vessel and vented off from the bottom.
c) Ensure the appropriate purge flow volumes are obtained or verified by approved engineering practices
d) If nitrogen is used, the space is normally pressurized (within safe limits) and then vented off.
e) If using steam or inert gases, take extra precautions to cool the confined space and ensure adequate oxygen supply refer to the Confined Space COP.
f) Once purging is completed fill the space with clean respirable air and retest the atmosphere if it is in preparation for confined space entry.
g) Proper bonding is required to prevent any possible issues with static electricity refer to the Grounding and Bonding SOP.

6.12 Inerting Overview

Inerting means to intentionally flood the atmosphere inside a confined space with an inert gas such as nitrogen to eliminate the hazard of igniting flammable vapours. Inerting creates an oxygen deficient atmosphere.

If it is not reasonably practicable to eliminate an explosive or flammable atmosphere within the confined space through another means such as cleaning, purging or ventilation, then inerting of the workspace may be considered subject to the following:

a) All applicable entry precautions for high hazard atmospheres must be followed, except the requirement for continuous ventilation.

b) Every worker entering the confined space must be equipped with an SCBA or a supplied-air respirator (SABA) equipped with an escape bottle.
c) The atmosphere inside the confined space must remain inerted while workers are inside.
d) All ignition sources must be controlled in case the inert atmosphere is lost.
e) Escaping inert gas must not cause a hazard outside the confined space.

In **British Columbia**, a copy of the proposed work procedures must be submitted, in writing, to the WCB at least 7 days before a worker enters a confined space which has been inerted. No confined space entry is allowed until the WCB response has been received and the attached precautions followed.

Note: The procedure for inerting a confined space and the work procedures in the inerted atmosphere must be approved by the Operations Manager and certified by a professional engineer.

6.13 General Purging

a) The Safe Work Agreement Issuer will determine the atmospheric testing requirements (i.e., interval or continuous) and will test for the following:

Safe Limits
Oxygen 19.5% – 23.0%
H_2S 10ppm – 8 Hours
LEL < 10%
CO 25ppm – 8 Hours

First test the oxygen content as most monitors are oxygen-dependent and will not provide reliable readings in an oxygen-deficient atmosphere. Check the manufacturer's specifications as some monitors require the oxygen content to be greater than 16% to function correctly.

Note: The employer must ensure that the testing required by subsection (1) is performed using calibrated test instruments appropriate for the atmosphere being tested and the instruments are used in accordance with the manufacturer's specifications. Personal gas monitors Must not be used in place of a gas detection unit.

b) Workers must not be exposed to a substance as per the following regulations:

1. **In Alberta,** worker exposure to any substance listed in the OHS Code (Schedule 1, Table 2) must be kept as low as reasonably achievable and must **not** exceed its OEL or ceiling limit listed in Table 2 at any time.
2. **In Saskatchewan**, worker exposure to any substance listed in the OH&S Regulations (Table 21) must be kept as low as reasonably achievable and must **not** exceed the OELs listed in Table 21.
3. **In British Columbia**, no worker shall be exposed to a substance that exceeds the ceiling limit, short-term exposure limit, or 8-hour TWA limit prescribed by ACGIH. For all hazardous substances, regardless of any

assigned exposure limit, the guiding principle is elimination of exposure or reduction to the lowest level that is reasonably achievable that is below the exposure limits found in the Exposure Limits for Chemical and Biological Substances, refer to OHS Guideline G5.48-1.

c) All hydrocarbons must be removed from vessels or piping systems with inert gas, steam, or water before admitting any air into the vessel or piping.
d) Lines or drains must not be opened any wider than necessary (to avoid generating large static charges).
e) If unable to open the vessel:

- Maintain correct pressure level to avoid pulling a vacuum as the vessel cools down.
- Inject steam or nitrogen to maintain small positive pressure.
- Leave vent valve open.

Note: Prior to using the following purging procedures, they must be reviewed and approved by Harvest's Superintendent or Project Manager. This includes any procedures being used by a contract service provider.

6.14 Purging with Steam

Steam purging is a common method used for removing hydrocarbons. If steam is being used, all drains as well as vents, at the highest point in the unit, should be left open (cracked) until tests show that only steam or water, or both, is issuing from each drain and vent on the unit.

When purging with steam, proceed with the following steps:

1. Pump out or depressure the vessel as empty as possible.
2. Drain the remainder to a suitable facility (e.g. blow down or slop system).
3. Depressure the vessel, either into the system or, if approved, the atmosphere.
4. Open a vent on the top of the vessel.
5. Inject steam near the bottom of the tower or vessel for a specified period of time as per the calculated purge volumes.
6. A visible plume of steam should be vented for an appropriate time period and pressure. Consult the facility equipment manuals and follow Critical Task/JSAs.
7. Drain the liquid steam condensate continuously from the vessel bottom.
8. Keep the drain open to avoid steam condensate buildup. Ensure that related equipment and vessels such as float columns, gauge glasses, etc., are drained and vented as well.
9. If the vessel will not be opened immediately, monitor the pressure carefully to avoid creating a vacuum as it cools. Inject steam to maintain a positive pressure, or leave vents and drains open.
10. In the case of pipelines: for further details refer to the Harvest Pipeline O&M manual.

- Steam the pipeline from one end to the other.
- Drain the condensate at low point drips.

Note: In cold weather, avoid steaming the equipment to piping systems that could freeze.

11. Upon completion of the steam purge allow system to cool.
12. Prior to entry, conduct atmospheric testing for explosive gases, toxic gas, and oxygen. Refer to the Confined Space Entry COP section for details.

6.15 Purging with Nitrogen or Water

The Worksite Supervisor or contract service provider must follow approved written procedures, the manufacturer's instructions, and industry best practices when purging equipment with nitrogen or water.

The following are minimum guidelines that should be considered when developing a work plan.

6.15.1 Purging a Vessel with Nitrogen

1. Since nitrogen is lighter than steam, it is commonly admitted at or near the inlet of the unit (injected into the top of the vessel) and exhausted out of a bottom connection.
2. Complete purging of one vessel before purging of a connected vessel commences.
3. If parallel paths of flow exist in a unit, ensure each path is purged.

6.15.2 Purging a System with Water

If a system is to be purged by filling it with water and then replacing it with fuel gas, note the following:

1. Does water have an adverse effect on the system?
2. Is the system able to withstand the additional weight of the water?
3. All associated equipment (e.g., sight glasses, level columns, etc.) will have to be vented to ensure the entire system is full and free of air locks.
4. Be aware that the movement of solids (e.g., wax, sand, and sludge) lying between baffles in vessels may cause the solids to release toxic gases.
5. Water may absorb the toxic gases under pressure and release them when the pressure is reduced.
6. When the unit is full, fuel gas is connected to the highest point of the unit and is allowed to replace the water in the system as the water is drawn off. Ensure the system is not under a vacuum at any time.
7. When the unit is empty of water, the system can be pressured with fuel gas to the appropriate pressure and all fittings and flanges, etc. can be pressure tested for leaks.

6.15.3 Purging a Vessel with Water

1. Pump out or depressure the vessel to its most empty state. Drain the remainder to a suitable facility.
2. Vent the vessel at the highest and safest possible point.
3. Install and secure an overflow hose in the top of the vessel and run the hose to a suitable container. Pump fresh water into the bottom of the vessel.
4. Overflow the vessel to flush out hydrocarbons, condensates and gas.
5. Open the vessel to the atmosphere to prevent pulling a vacuum and collapsing the vessel.
6. Drain the vessel to a suitable facility. Allow the vessel to air out, or use blowers to force aerate.
7. Gas test the vessel before entry to determine if additional purging is required. Unknown atmospheres must be tested wearing self contained or supplied air respirators.

FIRED HEATERS

5.1 FIRED HEATERS

5.1 Introduction

The Fired Heaters Safe Work Practice describes the procedures for safely lighting fired or flame-type equipment (line heaters, thermal electric generators (TEGs), fired heaters) and for conducting flame arrestor testing on fired equipment.

Fired or flame-type equipment means any electrical or fired heating equipment using an open flame, electric arc or element and includes a space heater, torch, heated process vessel, boiler, electric arc or open flame welder, or an open element electric heater or appliance.

5.2 Policy

The Fired Heaters Safe Work Practice applies to all Harvest Operations Corp. (Harvest) employees and contractors at Harvest facilities, worksites, or at locations where Harvest is the contract operator.

Where a Critical Task/Job Safety Analysis (JSA) has been written that follows the minimum components of, and meets the intent of the criteria in this practice, it shall take precedence over specific requirements herein.

All new installations of fired or flame-type heaters must include automatic ignition systems.

Note: Should situations arise which are not adequately covered in this safe work practice or other reference manuals, bring it to the attention of your Worksite Supervisor.

5.3 Regulatory Requirements, ERCB Directives and IRPs

This safe work practice is based primarily on the Alberta, British Columbia Occupational Health and Safety Codes and Regulations with information included from other government agencies, CSA/API standards, and industry best practices.

Harvest expects all workers and contractors to follow and work in compliance with the following legislation for the jurisdiction in which they operate which includes:

a) **Alberta Occupational Health and Safety Code (2009):** Part 10 Fire and Explosion Hazards, and extracts from other relevant Parts
b) **Alberta Oil and Gas Conservation Regulations (2009):** Sections 8.090 and 8.100 Fired Equipment and Engine Exhaust
c) **Alberta Municipal Affairs:** Code for Electrical Installations at Oil and Gas Facilities
d) **British Columbia Occupational Health and Safety Regulations (to July 2009)** Part 4 General Conditions, Part 23 Oil and Gas, and extracts from other relevant Parts

e) **British Columbia Drilling and Production Regulation (2004):** Section 62 Fire Control
f) **Saskatchewan Occupational Health and Safety Regulations (to 2007)** Part 25 Fire and Explosion Hazards, and extracts from other relevant Parts
g) **Saskatchewan Energy and Resources:** Oil and Gas Conservation Regulations, and Standard S-01 Saskatchewan Upstream Storage Standards
h) **Energy Resources Conservation Board (ERCB):** Directive 037 Service Rig Inspection Manual; Directive 060 Upstream Petroleum Industry Flaring, Incinerating, and Venting; Directive 067 Requirements and Procedures for Facilities
i) **Enform:** IRP #20 Well Site Design Spacing Recommendations
j) **CSA Z343-98 (R2002):** *Test Methods for In-Line and Firebox Flame Arresters*
k) **API RP 12N (R2008):** *Recommended Practice for the Operation, Maintenance and Testing of Firebox Flame Arrestors*

5.4 Responsibilities and Duties

5.4.1 Superintendents, Field Foremen, Lead Operators

Superintendents, Field Foremen, Lead Operators are responsible for:

a) Ensuring the Fired Heaters Safe Work Practice is implemented and followed at all facilities and worksite locations in their area of responsibility.
b) Selecting the types of fired heaters permitted on Harvest worksites.
c) Selecting approved contractors that provide fired heaters, or inspection and maintenance services of fired heaters.

Note: This responsibility includes reviewing and approving contractor procedures that are within the scope of this safe work practice. The contractor's procedure must comply with applicable legislation and provide an equivalent level of safety and worker protection. All contract service workers must be competent in the procedure.

d) Ensuring relevant training has been provided to workers who are required to light heaters or test flame arrestors.
e) Ensuring routine safety checks, inspections, or audits are conducted to ensure the procedures for lighting and maintenance of fired heaters and/or other control measures are being followed.
f) Ensuring there is a system in place to distribute new regulatory requirements for fired heaters and flame arrestor testing.

Note: Additional support and resources will be made available by the EH&S team.

5.4.2 Worksite Supervisor and/or Designated Alternates

The Worksite Supervisor is responsible for:

a) Ensuring potential hazards associated with lighting heaters and flame arrestor testing are identified, communicated to workers, and that control measures are in place.
b) Issuing a Safe Work Agreement for work involving fired heaters.
c) Ensuring heaters are located and remain outside hazardous locations and specified clearance distances as per regulatory requirements.
d) Knowing the lighting procedures and inspecting contractor-supplied portable heaters.
e) Ensuring the manufacturer's manual/specifications are available at the worksite.
f) Ensuring all faulty or malfunctioning heaters are taken out of service, tagged, repaired, and/or replaced by an approved contractor.
g) Ensuring proper personal protective equipment (PPE) is being used correctly.
h) Checking and confirming the competency of workers who are required to light heaters and test flame arrestors.

Competent, in relation to a person, means adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

i) Ensuring workers who are responsible for lighting fired heaters or testing flame arrestors are trained in this safe work practice.

5.4.3 Workers

Workers who are required to light fired heaters or test flame arrestors are responsible for:

a) Following this safe work practice, a Critical Task/JSA, or the manufacturer's instructions when required to light and operate fired heaters.
b) Complying with the conditions and PPE requirements recorded on the Safe Work Agreement.
c) Reporting to the Worksite Supervisor any heater which is not functioning or lighting properly.
d) Obtaining permission from the Worksite Supervisor to bring portable electric or propane heaters used to heat building spaces, which are not approved for the specific service, onto the worksite. A Safe Work Agreement may be required.
e) Reporting to the Worksite Supervisor any spills, incidents, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

5.5 Training Requirements

Harvest workers whose job responsibilities and duties include lighting fired equipment and flame arrestor testing will receive on-the-job training on this practice and a review of the applicable Critical Task/JSA. Refer to the Training Requirements as per Job Function, in Harvest EHSMS.

Note: Prior to lighting any flame-type equipment or conducting flame arrestor testing a worker must first demonstrate their competency to the Worksite Supervisor.

5.6 Hazards

Hazards associated with lighting fired equipment or flame arrestor testing include but not limited to:

- Fire and explosion
- Burns
- Toxic gases
- Poor ventilation

5.7 Additional PPE Requirements

Additional PPE that may be required when lighting fired equipment includes but not limited to:

- Face shield
- Fire-resistant clothing (required at all live worksites)
- Personal monitor or gas detector
- Fire extinguisher

5.8 Definition of a Direct and Indirect Fired Heater

Direct-fired Heater: The airflow goes directly over the flame.

Indirect-fired Heater: The airflow passes over some type of heat exchanger.

5.9 Locating Fired Heaters at the Worksite

The Worksite Supervisor or designated alternate (i.e., approved contractor) must ensure the fired heater is located outside the hazardous locations as defined in the OHS Code, Oil and Gas Conservation Regulations, ERCB Directives, Canadian Electrical Code and the Code for Electrical Installations at Oil and Gas Facilities.

1. The Alberta OHS Code (Part 10, Section 168), “Fire and Explosion Hazards” states:

   a) The intakes, exhausts and the fire box of a furnace or fired heater must not be located or operated in a Division 1, Zone 0 or Zone 1 hazardous location of any Class as defined in the Canadian Electrical Code. See Examples of Hazardous Locations in the Appendix.
   b) A furnace or fired heater must not be located or operated in a Division 2 or Zone 2 hazardous location of any Class as defined in the Canadian Electrical Code, unless:

      - The combustion process is totally enclosed except for the combustion air intake and the exhaust discharge,
      - All surfaces exposed to the atmosphere:

        - Operate below the temperature that would ignite a flammable substance present in the hazardous location, or
        - Are shielded or blanketed in such a way as to prevent a flammable substance in the hazardous location from contacting the surface.

   Note: If it is not reasonably practicable to comply with the above 1(b), Harvest must ensure that another effective safeguard is established.

   c) The combustion air intake and exhaust discharge are equipped with a flame-arresting device or are located outside the hazardous location.
   d) The Alberta, BC and Sask. Oil and Gas Regulations state that no flame-type equipment shall be placed or operated within 25m of:
   e) A well, oil storage tank, or other source of ignitable vapour.
   f) Any process vessels unless, where such is applicable, the flame-type equipment is fitted with an adequate flame arrester.

   Note: See provincial regulations for specific details and other permitted exceptions.

5.10 Hot Work Safe Work Agreement

A site specific orientation & hazard assessment, safety meeting and a Hot Work Safe Work Agreement:

a) Is required when using a mobile indirect-fired or direct fired heater within a classified area, see 10.9 1(b) and 2 above.
b) Is required for flame arrestor testing.

Note: Two workers must conduct the flame arrestor test.

5.11 General Safe Work Practices

a) The use of direct-fired heaters for other areas such as shops and camps is highly discouraged and is **not** allowed without adequate ventilation and permission from the Worksite Supervisor.
b) Fired heaters should be either equipped with a 20lb BC, dry chemical fire extinguisher or a fire extinguisher must be available within 9m while its operating.

Note: For additional information, see Harvest's Portable Fire Extinguishers SWP.

c) Prior to any adjustments or repairs to a burner, check the wind direction and ensure all vents and hatches are closed.
d) A wand designed for lighting heaters should be used. Never use a "torch" made of rags and flammable liquids to ignite fired equipment.
e) Never light heaters equipped with an automatic ignition system manually.
f) Heaters must be shut down for fuelling.
g) When heaters have been down for maintenance for an extended period of time or during freezing weather, a worker should remain at the location (along with a fire extinguisher) during the firing-up operation, until it is determined through checks that the heater is operating properly.
h) When heaters are opened for cleaning, inspection or repairs, extreme caution should be exercised to avoid explosions due to open fires, matches, or sparks around the open vessel.
i) All ducting linking the fired heater to a worksite shall be flame resistant. Flame-resistant material ducting contaminated with oil or other combustible material must not be used.
j) Fired heaters are required to have emergency shutdown procedures prominently posted on the exterior of the heater.

5.12 Monitoring Heaters

a) The Worksite Supervisor is responsible for ensuring the heater and surrounding area are checked at least once per shift (or as required by the Safe Work Agreement) to make sure the area is free of any fire hazards such as gas, oil, or fuel leaks.
b) This inspection requirement applies whether or not a Safe Work Agreement has been issued for the heater unit.

Note: Some facilities may require more frequent inspections; check with the Harvest Superintendent or Field Foreman before using heaters of any kind

5.13 Lighting Heaters

The following procedures are not intended to be a technical step-by-step, how-to-instructional for lighting all types of fired heaters. The appropriate government regulations, directives, safe work practices, Critical Tasks/JSA's, and manufacturers' instructions must be consulted and applied with due diligence.

5.14 Manual Ignition of Line Heaters

a) Refer to the Harvest Critical Task/JSA: Lighting Burners in the EHSMS.

Note: Notify your Supervisor if the main burner fails to ignite.

b) For heaters with an automatic ignition system, see lighting of fired heaters with an automatic ignition in this safe work practice.

5.15 Lighting of Fired Heaters with Automatic Ignition System

a) Most fired heaters are equipped with an automatic ignition system which does not require manual lighting.
b) Never light a fired heater manually if it is equipped with an automatic ignition system. Consult with an instrument technician to determine the malfunction.
c) If a fired heater is not equipped with an automatic ignition system, light it manually by following the same procedure used to light a line heater in accordance with the applicable manufacturer's specifications.

5.16 Lighting of Thermal Electric Generators (TEGs)

TEGs must be ignited in accordance with the applicable manufacturer's specifications.

5.17 Flame Arrestor Testing of Fired Equipment

Flame arrestors must work as designed in order to provide required protection of gas fired units that are equipped with these devices. Preventative maintenance programs must address testing of these arrestors.

The following procedure will assist operations personnel in developing written Critical Tasks/ JSA's for testing of flame arrestors on natural gas fired and natural draft systems with a continuously burning pilot. This procedure applies in all field and plant sites where periodic flame arrestor testing is performed.

5.18 Potential Hazards

- Flashbacks
- Fires and explosions
- Static electricity

5.19 Required Test Equipment

- LEL gas detector
- 20 lb propane bottle (no regulator)
- 20 ft flexible propane hose c/w ¼ turn valve
- 10 ft (minimum) wand of ⅜"- ¼" diameter open-ended pipe
- 2 – 30 lb BC fire extinguishers
- Silicone (for sealant)
- Snoop™ (a liquid leak detector) or use some other effective leak detector
- Fire-resistant clothing, gloves, goggles, or face shield

5.20 Pre-Testing Requirements

1. First check to see if there is a Critical Task/JSA in place at the worksite or facility.
2. This pre-testing procedure requires two workers to conduct the test.
3. Prior to starting the test, a Safe Work Agreement for "hot work" must be issued.
4. Workers must wear the additional PPE (e.g., fire-resistant coveralls, gloves, goggles, face shield, etc.) identified during the site specific orientation & hazard assessment, or on the Critical Task/JSA, and recorded on the Safe Work Agreement.
5. The area in the vicinity of the flame arrestor to be tested must be checked with an LEL gas detector to ensure the absence of combustible gases and continuously monitored as per the hot work agreement.
6. All sources of ignition must be removed from the test area or be extinguished.
7. The burner must be operating in the normal mode.
8. A thorough inspection must be made to ensure that all holes are properly plugged; all mounting flanges are tight; all bolts are in place and secured; the

flame cell element is clean and undamaged or distorted; and no visible flash through holes exist.

9. Facility fire detection equipment may be required to be bypassed for the duration of the test to avoid unnecessary shutdowns. The system must be activated after completion of the test.

For details, refer to Harvest's Bypassing Safety Devices Safe Work Practice.

Note: Some complex systems may require a Critical Task/JSA before approval is granted to bypass the safety shutdown system.

5.21 Testing Procedure

1. This testing procedure is designed to quickly flood the face of the flame arrestor flame cell with an ignitable mixture and detect flashback before the mixture reaches the pilot or main burner.
2. First check the fuel gas piping and hose for leaks with the Snoop™ leak detector.
3. Adjust the burner to high flame.
4. Position propane bottle at least 6m from the flame arrestor (one worker to man valve on propane bottle and the other worker to handle the ¼ turn valve and wand).
5. Prior to starting the test, the test fuel gas piping and hose must be checked for leaks with Snoop™.
6. Place the open end of the test wand in front of the arrestor standing back at least 3 metres.
7. Open ¼ turn valve and instantaneously inject a small amount of propane into the arrestor while rotating the wand starting at the perimeter of the cell and then around the honeycomb of the flame cell.
8. If a flashback occurs, silicone around the edge of the honeycomb where it meets the case and centre bolt. Then repeat the test.
9. If no flashback occurs, the propane should extinguish the pilot and burner in the heater without flashing back.
10. Before re-lighting the burner, turn off the main gas supply to the burner and pilot and allow the combustion chamber to purge itself of all gases (at least 20 minutes).
11. If the flame arrestor fails, contact the Worksite Supervisor immediately.

5.22 Test Failure

1. In the case of a test failure, the flame cell elements should be replaced – never repaired.
2. After the element has been tested, other components of the gas burning system should be tested by directing a small amount of propane on them:

    - Around fire tube extension in all places where the flame arrestor is attached,

- Welding around the flame arrestor casing and around the fire tube extension, and
- On all attachment flanges, plugs, and connections.

3. Testing of the welds is desirable since ignition could occur through small holes in the welding. Testing of the fire tube extension and flame arrestor casing should be done when the heater is being fired at near full load so that hot flue gases are present in the fire tube and its extension.

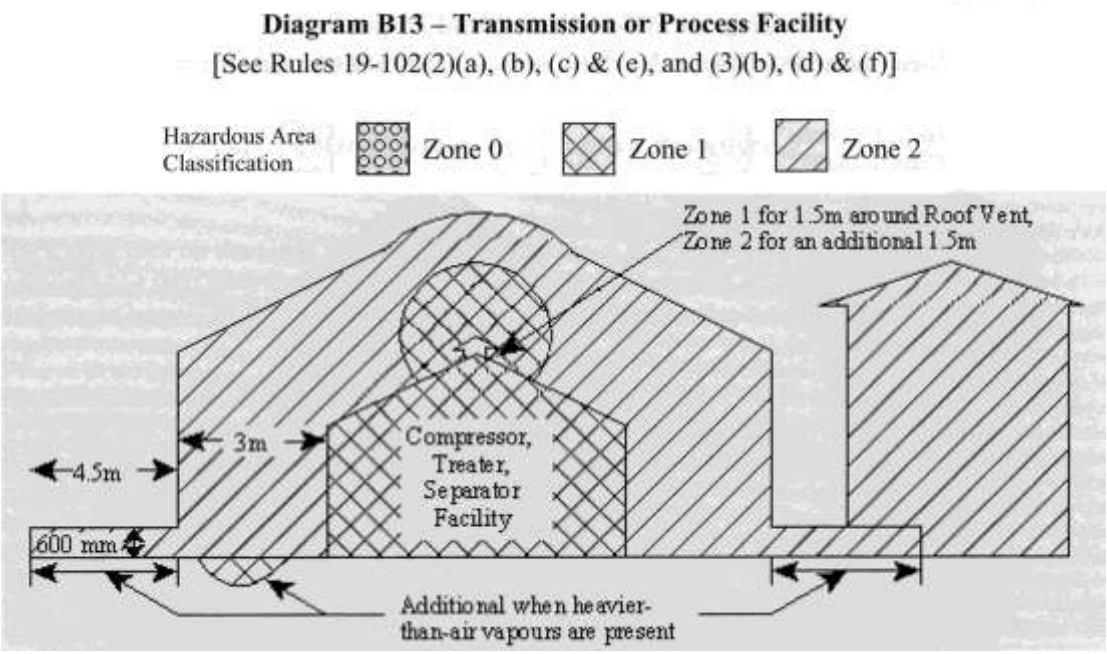
5.23 Frequency of Testing

a) All flame arrestors shall be checked every 2 years with documentation of the tests placed on file at the worksite. Operating conditions may require a more frequent testing schedule. Retain all test records for at least 2 years; 3 years where there was a reportable incident.
b) All new equipment with flame arrestors must be checked immediately after installation.
c) All used or surplus equipment must be checked after relocating and installation is complete.

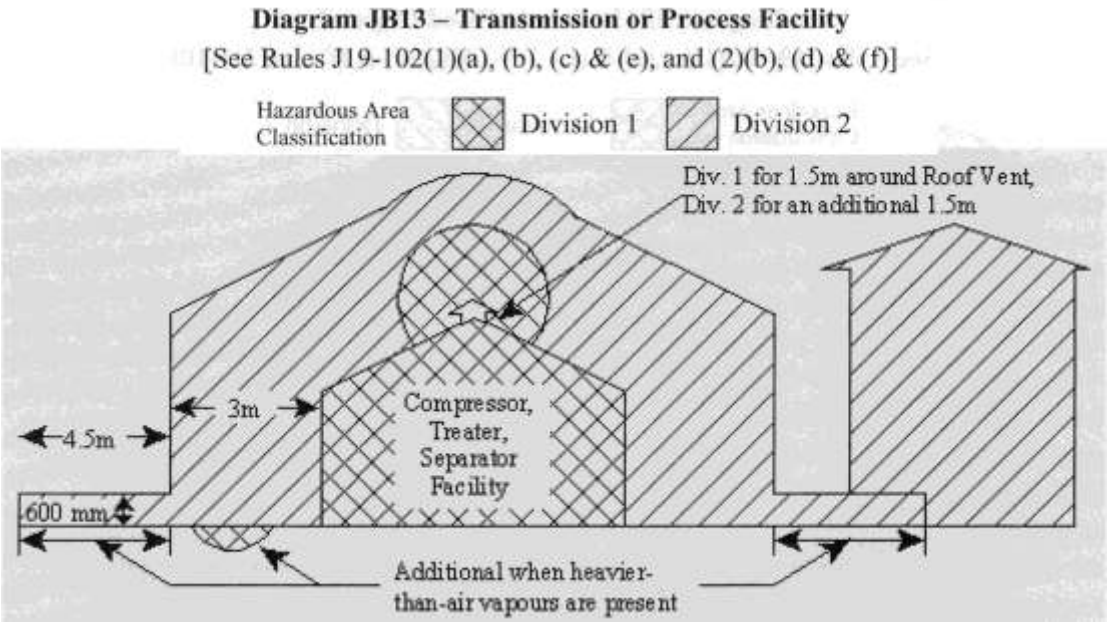
Appendix A – Examples of Hazardous Locations

The following examples are found in the Code for Electrical Installations at Oil and Gas Facilities by Alberta Municipal Affairs.

Zone 0, Zone 1, and Zone 2



Same location using Division 1 and Division 2



Zone 0, Zone 1, and Zone 2

Diagram B11 – Typical Wellhead

[See Rules 19-102(2)(c), (3)(a) and 19-106(1), (2)(a) & (b)]

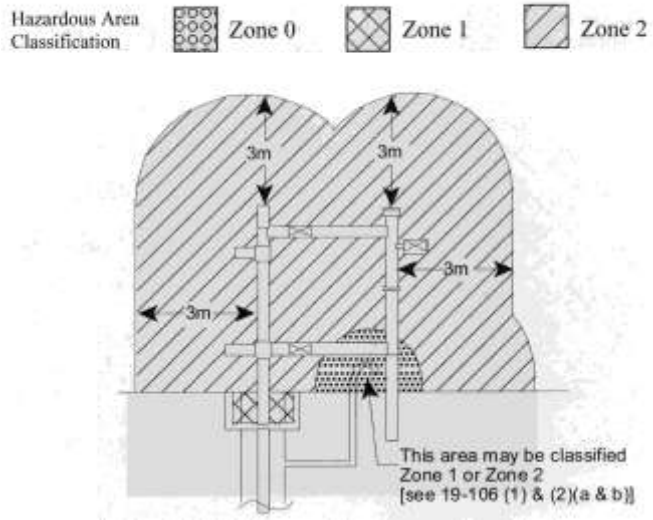
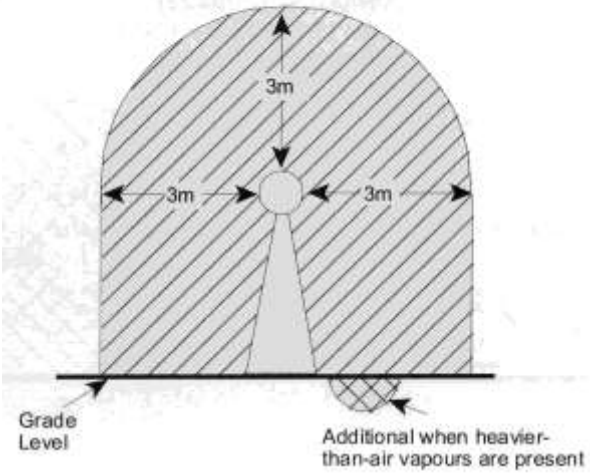


Diagram B12 – Valves, Pumps, Manifolds, etc. (Outdoors)

[See Rules 19-102(2)(c), (3)(a)]



Same Equipment using Division 1 and Division 2

Diagram JB11 – Typical Wellhead

[See Rules J19-102(1)(c), (3)(a) and 19-106(1), (2)(a) & (b)]

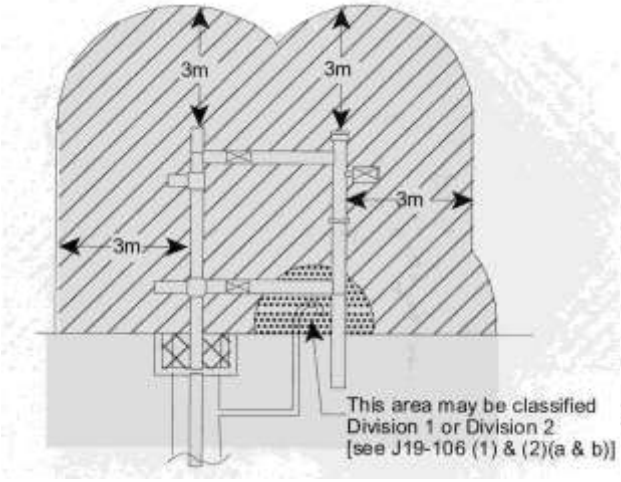
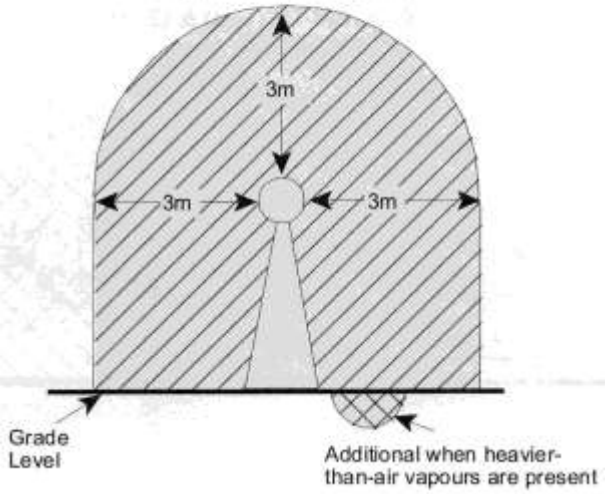


Diagram JB12 – Valves, Pumps, Manifolds, etc. (Outdoors)

[See Rules J19-102(1)(c), (2)(a)]



FIRE SAFETY & PREVENTION

6.0 FIRE SAFETY & PREVENTION

6.1 Introduction

Fire safety and prevention is a concern for all Harvest Operations Corp. (Harvest) facilities, worksites, and offices. The most common cause of a fire is poor housekeeping and allowing trash and other waste materials to accumulate in locations where there is a possible ignition source.

Note: This Safe Operating Procedures (SOP) does not cover fire-related regulations for electrical work, or provincial fire codes that are not included in OHS Codes and Regulations.

6.2 Policy

The Fire Safety and Prevention SOP applies to all Harvest employees and approved contractors at Harvest worksites or at locations where Harvest is the contract operator.

a) For information on fire extinguishers, see Forms, Portable Fire Extinguishers.
b) Refer to the Harvest's Corporate Emergency Response Plan for further fire prevention planning and fire-related emergency response procedures for Harvest facilities and worksites.

6.3 Regulatory Requirements

This SOP is based primarily on Alberta's OHS Code with requirements specific to British Columbia (BC) and Saskatchewan (SK) identified as a separate note in the appropriate section. However, managers and supervisors must remain knowledgeable and current with regulatory legislation for the province in which they operate. As well, employees and contractors must be aware of specific government legislation and regulatory requirements.

The following is the primary fire-related health and safety legislation in Alberta, British Columbia, and Saskatchewan.

a) **Alberta Occupational Health and Safety Code (2009)** Part 10 Fire and Explosion Hazards, and extracts from other relevant Parts
b) **ENFORM** IRP #18 - Well Site Design Spacing Recommendations
c) **British Columbia Occupational Health and Safety Regulations (to July 2009)** Part 4 General Conditions, Part 23 Oil and Gas, and extracts from other relevant Parts
d) **Saskatchewan Occupational Health and Safety Regulations (amended to 2007)** Part 25 Fire and Explosion Hazards, and extracts from other relevant Parts
e) **Work Safe Alberta, British Columbia and Saskatchewan** Fire Safety and Prevention Reference Publications
f) **NFPA 10, Standard for Portable Fire Extinguishers (2007**)

6.4 Responsibilities and Duties

6.4.1 Superintendents, Field Foremen, Lead Operators

Superintendents, Field Foremen, and Lead Operators are responsible for:

a) Ensuring the Fire Safety and Prevention SOP is implemented and followed at all facilities and worksite locations in their area of responsibility.

Note: This includes implementing the portable fire extinguishers and other fire-related SOP's.

b) Selecting approved contractors to provide fire prevention training/firefighting services.
c) Performing routine safety checks, inspections, or audits are completed to ensure the procedures for fire safety/prevention and/or that other control measures are being followed.
d) Ensuring there is a system in place to distribute new regulatory requirements for fire safety and prevention.

Note: Additional support and resources will be made available by the EH&S team.

6.4.2 Worksite Supervisor and/or Designated Alternates

The Worksite Supervisor is responsible for:

a) Ensuring the location of all fire detection, alarm, and firefighting equipment is communicated to all workers. This includes SDS for the extinguishing agent.
b) Maintaining an up-to-date emergency telephone list with instructions for reaching the nearest fire, police, ambulance, physician, hospital, or other appropriate services, along with written emergency response and rescue procedures.

Note: The location of the telephone list and emergency procedures must be known to all workers. This includes evacuation routes and muster points.

c) Ensuring workers know the potential fire and explosion hazards at the worksite.
d) Holding an annual fire drill at facilities and worksites under their supervision.
e) Ensuring all portable fire extinguishers are identified, labelled, inspected, and maintained according to the Portable Fire Extinguishers SOP.

Note: This also includes inspecting portable work trailers and camp kitchen facilities.

f) Completing an Incident Report whenever a fire extinguisher is used or a fire alarm is activated Workers

All workers (includes contractors) are responsible for:

a) Knowing the location of all fire alarms and firefighting equipment (i.e., portable fire extinguishers, fixed sprinkler systems, hose reels, etc.) in their work area.
b) Knowing the location of the emergency telephone list and emergency response and evacuation procedures for fires/explosions and uncontrolled releases and spills.
c) Obeying all smoking rules for the worksite or facility.
d) Knowing the sound of the fire alarm and other detection devices (i.e., H_2S).
e) Wearing additional PPE as identified during the site specific orientation & hazard assessment or by the type of work. For details, refer to the Harvest's General Rules, Clothing, in the EHSMS.
f) Following this SOP, Critical Tasks/JSAs, or instructions concerning fire safety/prevention and portable fire extinguishers from their Worksite Supervisor.
g) Ensuring no equipment or material blocks access to firefighting equipment, alarm systems, or the evacuation routes.
h) Reporting to the Worksite Supervisor when a portable fire extinguisher is used or the fire alarm is activated.
i) Reporting to the Worksite Supervisor any missing or damaged fire extinguishers or signage, and any existing or potential fire hazards, incidents, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

6.5 Fire Hazards

Hazards associated with fires include physical injury, explosion, and toxic gases which are present in the smoke or from the fire's radiant heat.

Caution must always be exercised when evaluating fire or explosion hazards that may be present within a work area. Workers are responsible for mitigating or eliminating fire hazards by:

a) Proper handling, transporting, storage, bonding or grounding of combustible materials.
b) Elimination or control of ignition sources where potential combustible vapours, gases, liquids, or hazardous materials may be present.
c) Following good housekeeping practices and obeying "No Smoking" rules.
d) Using intrinsically safe equipment.
e) Conducting fire equipment inspections and annual fire drills.

6.6 PPE Requirements

High Visibility FRC must be worn at all times on live Harvest worksites.

Additional PPE may be required in accordance with the site specific orientation & hazard assessment, the level of risk and regulatory requirements which may include:

- Arc flash suits
- Respiratory equipment

6.7 Training

Harvest workers may be provided with on-the-job training in fire safety and prevention pursuant to their work activities. For further details, refer to Harvest's Training Requirements as per Job Function in the EHSMS. The training may also be provided through courses by recognized instructors. This training will be followed by refresher training and may include but is not limited to the following:

a) Understanding the source, causes, and classification of fires.
b) Discussion of proper fire prevention techniques.
c) Participating in fire drills and fire extinguisher training exercises.
d) Location of fire alarms and extinguishers, and fire extinguishing techniques.
e) Proper methods and procedures for reporting emergencies.
f) Harvest's Emergency Response Plan and evacuation procedures.

In British Columbia: Workers assigned to firefighting duties must be given adequate training, by a qualified instructor, in fire suppression methods, fire prevention, emergency procedures, organization and chain of command, firefighting crew safety, and communications applicable to their workplace. Additional requirements include:

- Retraining for firefighting duties must be provided periodically but not less than once a year.
- A worker assigned to firefighting duties must be physically capable of performing the assigned duties safely and effectively before being permitted to do them.

6.8 Fire Detection and Extinguishing Systems

a) All fire detection systems and extinguishing systems shall be tested, inspected, maintained, or calibrated according to:

- The facilities inspection and maintenance program,
- Management of Change COP,
- Government regulations, and
- CSA standards, NFPA and manufacturers' specifications.

b) All inspection and maintenance records will be retained at the facility as per Harvest's policy.

6.9 Fire Safety and Prevention for Workers

All Harvest workers will comply with the following fire prevention practices when performing their daily tasks and work routines.

a) All workers must know the location of portable fire extinguishers, fixed sprinkler systems, hose reels, hydrants, standpipes, fire blankets, and facility gas shut-off valves.
b) Permission must be obtained from the Worksite Supervisor to use fire hoses for any purpose other than fire extinguishing.
c) As a general rule, on entering a Harvest lease or worksite, a vehicle must not approach or park within 7.5m of any wellhead, piping, process vessel, process facility/building or tank containing combustible fluids unless otherwise permitted under a Safe Work Agreement, a Critical Task/JSA, or some other written and approved procedure.

No vehicle can operate within a 3m radius of the wellhead, except vehicles that are specifically required to do so as part of an approved operation being performed on a well.

In the case of well servicing where the vehicle is not part of the job, the vehicle must not approach or park within 25m of the job.

Note: Other parking is only permitted in areas designated by the Worksite Supervisor.

d) Materials (cloths, boxes) must not be hung or stacked in front of firefighting equipment.
e) Evacuation routes must be kept open and clear of equipment or materials.
f) Good housekeeping practices must be followed at all times.
g) Paint, thinners, oil, grease, and similar combustible materials must be stored in metal cabinets away from sources of heat, open flames, sparks, or other sources of ignition.

Note: Secondary containment may be required for certain hazardous materials.

h) Oily or paint-soaked rags, used filters, clothing, and other combustible material must be placed in covered metal garbage containers. Empty containers often and dispose of the contents safely. These garbage containers must be clearly labelled for this purpose.
i) Mops or wiping cloths must not be dried near engine exhausts or other sources of ignition.
j) Pyrophoric material must be recognized and properly stored in a metal container and disposed of as soon as possible.
k) It must be determined beforehand that no source of ignition is nearby when releasing gas or mixing flammable chemicals.
l) Spills and drips must be cleaned up and leaks repaired as soon as possible.
m) Smoking is only permitted in designated areas and only safety matches are permitted.
n) The use of gasoline or other highly flammable products as a cleaning agent is prohibited.
o) Ensure emergency exits from buildings are clear and panic hardware is in good operating condition.

6.10 Fire Prevention for Equipment and Facilities

a) Where a flammable substance is hauled or processed at a worksite or facility, the location must be classified as a hazardous area. Designated areas at each worksite or facility must be established for the storage of flammable liquids and materials.
b) Bonding and grounding cables must be used between tank trucks and tanks, and between containers when sampling. For further details refer to the Harvest's Grounding and Bonding SOP in the EHSMS.
c) When transferring hydrocarbon (namely low flash point liquids) from a line or vessel to another container, the source container and the receiving container must be electrically bonded and grounded to prevent ignition due to static electricity. Plastic pails are not permitted.
d) Entry to a work area is not permitted if more than 10% of the lower explosive limit (LEL) of a flammable or explosive substance is present in the atmosphere. An exception is only permitted for competent emergency/rescue personnel wearing appropriate PPE. Entry is strictly prohibited under any circumstances when the LEL is greater than 20%.

Note: In the case of confined space entries, always ventilate closer to 0% LEL.

e) Gas-operated controllers and pumps must be vented outside the building and the controller doors must be kept closed. All Cata-Dyne™ or catalytic-type heaters within closed areas should be vented to the open air.
f) Vacuum vents and flame arrestors must be inspected regularly. For details refer to Harvest's Fired Heaters SOP in the EHSMS.
g) Flame-type equipment must not be placed within 25m of any process equipment unless fitted with an adequate flame arrestor.

h) When refuelling, always ensure the engine, heating element, or burner is switched off and is not hot enough to ignite fuel spills.
i) A Safe Work Agreement for hot work must be obtained when introducing an ignition source into a hazardous area.
j) It is not permitted to bury or burn garbage, trash, or construction waste.
k) Stationary (fixed) gas monitoring devices must be checked regularly for marginal accumulations of gas in all monitored areas. Immediately isolate and correct any causes for sub-danger levels of gas. All gas detection systems must have a calibration and maintenance program as per the manufactures specifications as a minimum.
l) Only intrinsically safe flashlights, lanterns, and electrical extension cords are permitted within hazardous facility areas.
m) Arc flash and shock warning labels shall be located so they are clearly visible to workers before examination, adjustment, servicing, or maintenance of electrical equipment.
n) Vegetation must be controlled on Harvest worksites to reduce fire hazards and to prevent contamination of landowners' fields. Vegetation includes weed and grass around tanks, buildings and wells, and meter runs.

6.11 In Case of Fire

If you see or accidentally start a fire, follow these general rules or those instructions received from your Worksite Supervisor or approved emergency procedures for the worksite.

1. Alert fellow workers and raise the alarm.
2. Assess the hazards, consider:

    - Threat to life?
    - Evacuation or is extinguishing the fire possible?
    - Notification and assistance from outside authorities?
    - Hazardous or toxic chemicals present?
    - Hazards (i.e., explosion) due to damaged equipment, process, or property?

3. If safe to do so:

    - Rescue other workers; move to a safe location and if necessary administer first aid.
    - Cut off the fuel supply to the fire and depressure the system.

4. **If the fire is small** and it is safe to do so, attempt to extinguish it. If in doubt, leave the vicinity immediately.
5. **If the fire is large**, initiate Harvest's Emergency Response Plan (ERP) and secure the facility. Evacuate all personnel to the muster point and conduct a head count.

6. Call for assistance including outside sources (fire suppression services or the fire department).
7. Notify your Supervisor of the size and location of the fire.

Important:

a) The procedures in Harvest's Corporate Emergency Response Plan (CERP) shall take precedence over these general rules.
b) In any firefighting situation where workers cannot immediately control the fire, they must place their own safety and the safety of others first, before any consideration is given to equipment or material value. Escape must not be delayed.

6.12 Fire Extinguishers

Refer to the Portable Fire Extinguishers SOP.

6.13 Inspections

6.13.1 Fire Alarm Systems

Fire alarm systems should be checked monthly to ensure physical damage has not occurred. The alarm must be tested on a quarterly basis for proper functioning and the alarm panel lights should be checked daily to ensure the alarm system is maintained operable at all times.

Note: Frequency of inspection will be conducted as per government regulation or by a Critical Task/JSA, and the manufacturer's specifications.

6.13.2 Portable Fire Extinguishers

Refer to the Portable Fire Extinguishers SOP.

6.14 Building or Lease Entry

a) Prior to starting work at a Harvest worksite or lease, workers must have received a site specific orientation.
b) For instructions on entering worksites/ leases, see Harvest's Light Hydrocarbons COP.
c) All workers who enter a building or lease are required to wear a personal monitor capable of monitoring for LEL, and O_2 and if necessary H_2S and CO properties in the atmosphere.

Note: If a personal monitor or facility alarm sounds, the worker(s) must immediately exit the lease and complete a site specific orientation & hazard assessment prior to re-entering the lease or area.

6.15 Burning

Workers **are not** permitted to burn waste or rubbish of any type at the worksite. If wood or coal is burned to thaw the ground before digging:

a) A Hot Work Agreement is required.
b) A burning permit may be required by local authorities.
c) Signs must be posted if the burning is near a road.
d) Fire prevention equipment must be nearby and ready for immediate use.
e) The burning material must be constantly watched.
f) Burning is not permitted within 50m of any oilfield facility.
g) For ground thawing equipment the location of the heating equipment must comply with the Equipment Spacing requirements.

6.16 Compressed Gas Cylinders

a) After using compressed gas cylinders or as soon as the work is completed, return the cylinders promptly to their designated storage area.
b) Secure all cylinders in an upright position with the valve closed and ensure the valve protection cap is in place.
c) If cylinders are stored in cabinets, mark the cabinets to identify their contents along with the placement of WHMIS labels.
d) Secure cylinders with a chain, cable, strap so they will not fall. Do not use rope.
e) Do not secure cylinders to process lines or an electrical conduit.
f) Isolate and store empty cylinders separately from full cylinders and segregate cylinders by their contents.
g) Do not store oxygen cylinders within 7.5m (25ft) of combustible gas cylinders or near any other substance (oil or volatile liquids) where an accelerated fire could result, unless protected by an approved fire-resistant wall.
h) Out of service fuel gas and propane cylinders should not be stored in any building.
i) When cylinders are stored outside they are to be placed in a locked cage and protected from corrosion, direct sunlight, and adverse atmospheric conditions.

6.17 Portable Containers

All flammable liquids which are stored in safety cans must comply with CSA Standard B376 - M1980 (R2008), *Portable Containers for Gasoline and Other Petroleum Fuels* and be:

- Leak tight and for containers with 5 litres (1 gallon) or more capacity they are fitted with a pouring spout and vent to ensure pouring without pulsation, and
- Remain capped when not in use.

6.18 Flare Pistol or Gun

a) Where flare guns are required, a written procedure must be developed for the transport and operation of this equipment.
b) An approved and commercially-made flare gun must be used.
c) A flare gun must always be used from the upwind side of the ignition source.

6.19 Gas and Liquid Leaks

Report and repair all hydrocarbon liquid or gas leaks immediately. If immediate repairs are not possible, post a warning sign, isolate the area, and take extra precautions against fire. In the event of a hydrocarbon liquid or gas leak:

a) Isolate sources of ignition immediately,
b) Shut down engines and other potential sources of ignition such as pilot lights,
c) Shut off the fuel supply or process, if possible, and
d) Report the leak immediately to your Supervisor.

6.20 Gasoline and Propane Storage and Dispensing

a) The location of gasoline, diesel and propane storage tanks must comply with:

- AER Directive 055: Storage Requirements for the Upstream Petroleum Industry
- Petroleum Tank Management Association of Alberta (PTMAA)

b) Except for the fuel in the tanks of the operating equipment, no gasoline or other liquid fuel shall be stored within 25m of a well or process equipment. Engines with on-board tanks must be allowed to cool before refuelling.
c) The location of propane tanks (i.e., for pump jack engines) must comply with:

- CSA Standard B 149.1-00, Natural Gas and Propane Installation Code, and
- CSA Standard B 149.2-00, Propane Storage and Handling Code.

d) Containers must be of an approved type. If metal containers are used, grounding and/or bonding is required. For details refer to Harvest's Grounding and Bonding SOP in the EHSMS.
e) Shut off engines while refuelling.
f) When decanting from a storage tank to an approved containers proper grounding and bonding procedures must be used. For details, refer to Harvest's Grounding and Bonding SOP in the EHSMS.
g) Smoking is not permitted on leases except in designated areas. A sign stating "No Smoking" and "No Open Flame" must be posted within 3m of the gasoline storage area.
h) All gasoline/diesel spills must be reported to the Worksite Supervisor.

6.21 Paint, Solvent and Flammable Liquids Storage

For all flammable liquid storage, use CSA-approved containers (i.e., lids with seals, spouts with caps) which are clearly WHMIS labelled and stored in a metal cabinet. They shall be stored in a manner that if leakage from the primary containers occurs, it would be captured through secondary containment to prevent contamination. Review the Safety Data Sheets (SDS's) prior to handling, dispensing, or storing paints, solvents and other flammable liquids.

6.22 Pyrophoric Materials

a) Pyrophoric materials (e.g., iron sulphide) are those that ignite spontaneously in air below approximately 45º C. Consequently, the main hazard arising from the use of such materials involve fire, either from direct contact with the pyrophoric material or as a result of secondary fires following ignition.
b) Iron sulphide is present in most facilities where hydrogen sulphide and iron come into contact. Iron sulphide will ignite in the presence of air unless it is kept wet. It is not toxic and is found as a brown/black deposit in equipment such as vessels, tanks, piping, fittings, and exchanger bundles.
c) If iron sulphide is present, keep it wet until it can be loaded into appropriate containers for disposal. An inert gas purge may be necessary before admitting air to a vessel or system.
d) Ensure piping, fittings, and controls that have been removed are flushed with water and immediately taken to a safe area where any remaining residue can safely dry out and burn.

6.23 Use of Other Flammable Liquids

A wide variety of hydrocarbons and other flammable or combustible liquids are frequently used in day-to-day work activities and, therefore, special safety precautions must be observed to avoid a fire and explosion hazard.

When using flammable liquids, the following safety precautions must be adhered to:

a) Appropriate personal protective equipment (PPE) must be worn as per the product SDS sheet.
b) Review the Safety Data Sheets (SDS's) prior to handling, dispensing, or storing flammable liquids. Ensure the containers are labelled correctly as required under WHMIS and TDG Regulations.
c) Flammable liquids with a flashpoint below 38º C (100º F) must not be used as a cleaning agent. The cleaning agent must be manufactured for that purpose.
d) Check all approved containers for the following:

- Leakage,
- If so equipped ensure fusible links are in place and intact on self-closing tanks (i.e., varsol tanks), and

Note: In the event of a fire in an open container, the fusible link melts, closing the lid and smothering the fire. The inspection and replacement of fusible links must comply with the manufacturer's specifications.

- Tight-fitting covers are in place (to exclude air in tanks and bench cans).

e) Keep only the required amount of flammable liquids in the work area needed for the job at hand (to reduce the potential fire hazard).
f) When mechanically stirring flammable liquids, use only air-powered or induction motor-powered agitators and only where there is no source of possible ignition.
g) When dispensing, ensure both containers are electrically bonded and grounded. For details, refer to Harvest's Grounding and Bonding SOP in the EHSMS
h) Properly label all containers of flammable or toxic liquids to identify their contents. Follow WHMIS Regulations. Refer to Harvest's Workplace Hazardous Materials Information System SOP in the EHSMS.
i) Do not pour surplus or waste flammable liquids into any sink or drain leading to a sewer. Accumulate these liquids in suitable containers and dispose in an approved outside location.
j) Flammable liquid spills require immediate action to ensure that vapours do not reach a source of ignition. If safe to do so remove all sources of ignition in the area.

6.24 Forest and Grass Fires

Forest and grass fires present a potential risk to Harvest workers and property, and workers must be familiar with fire prevention measures and methods.

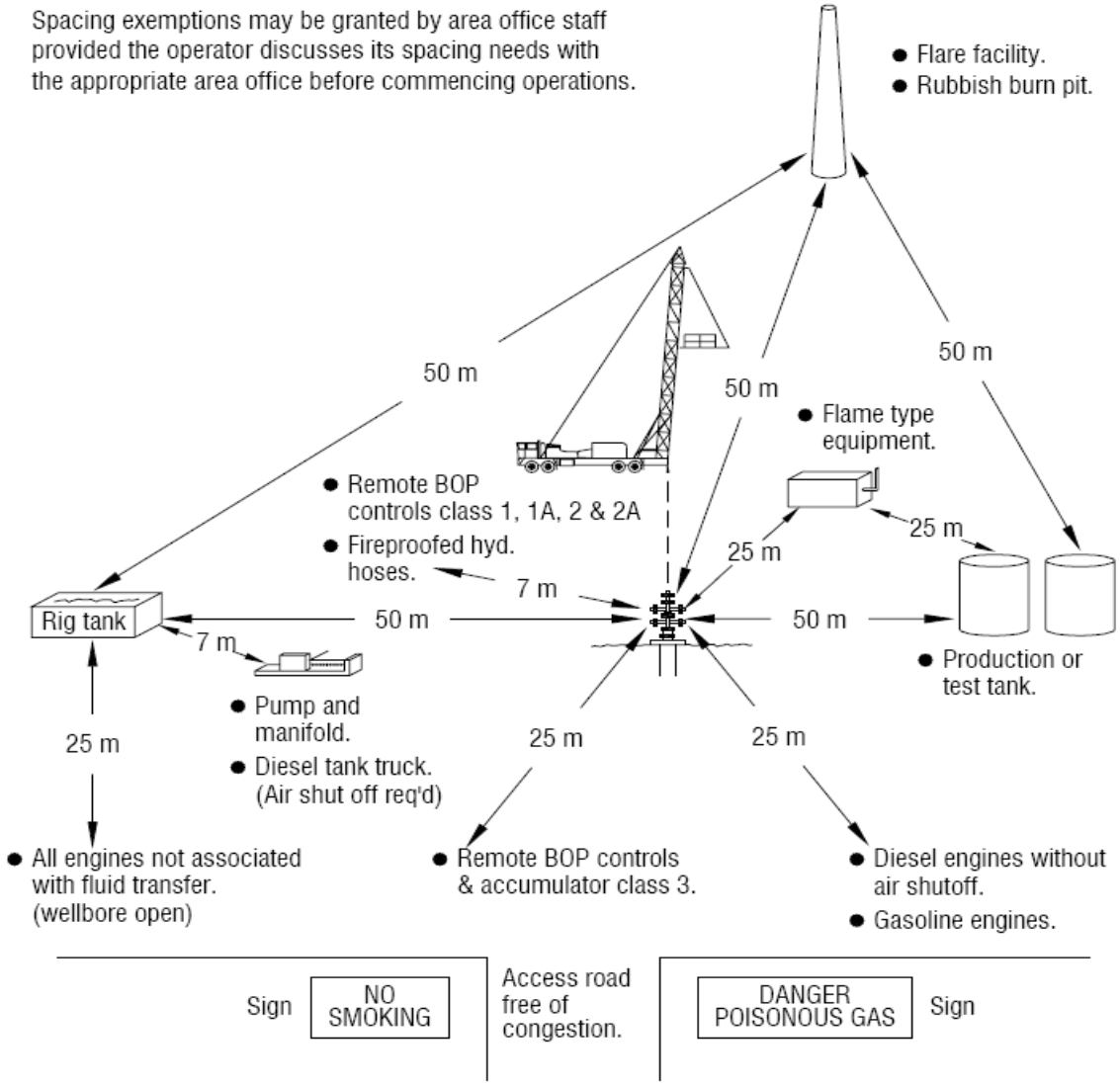
a) For details regarding wild fire prevention site specific orientation & hazard assessments and control measures refer to the Fire Smart Field Guide for Upstream Oil and Gas Industry that is located on the EHSMS flash drive.
b) All forest or prairie fires in close proximity to a Harvest facility will automatically considered an Alert and appropriate communications shall be initiated.
c) In the event that the facility needs to be evacuated, the Worksite Supervisor or designate, in consultation with management, will make the call in regards to the state that the facility will be left in. If management cannot be contacted or the decision must be made instantly, it will be the responsibility of the Worksite Supervisor or designate to shut down any endangered facility.
d) It will be the responsibility of Worksite Supervisor or designate to ensure that all personnel are accounted for at one of the designated muster points at the facility. In the event that the muster points are not accessible, the Worksite Supervisor or designate will determine an alternate muster point for personnel to meet. In every case, the safety of employees and the public is the first priority.
e) The Worksite Supervisor must contact the local forest district to become familiar with specific requirements.

- **Alberta** Sustainable Resource Development (SRD) Field Offices Toll Free: 1-877-944-0313
- **BC** Fort Nelson Forest District Telephone: 1-250-774-5511
- **BC** Peace Forest District Telephone: 1-250-784-1200
- **Saskatchewan** Field Offices Toll Free: 1-800-567-4224

f) When travelling by means of a vehicle through a forest-protection area during fire season, vehicles must be equipped with the following: shovel, axe (pulaski), receptacle (at least 5 litre capacity), and a 30lb ABC classification portable fire extinguisher.

Appendix A– Alberta Equipment Spacing for Well Servicing

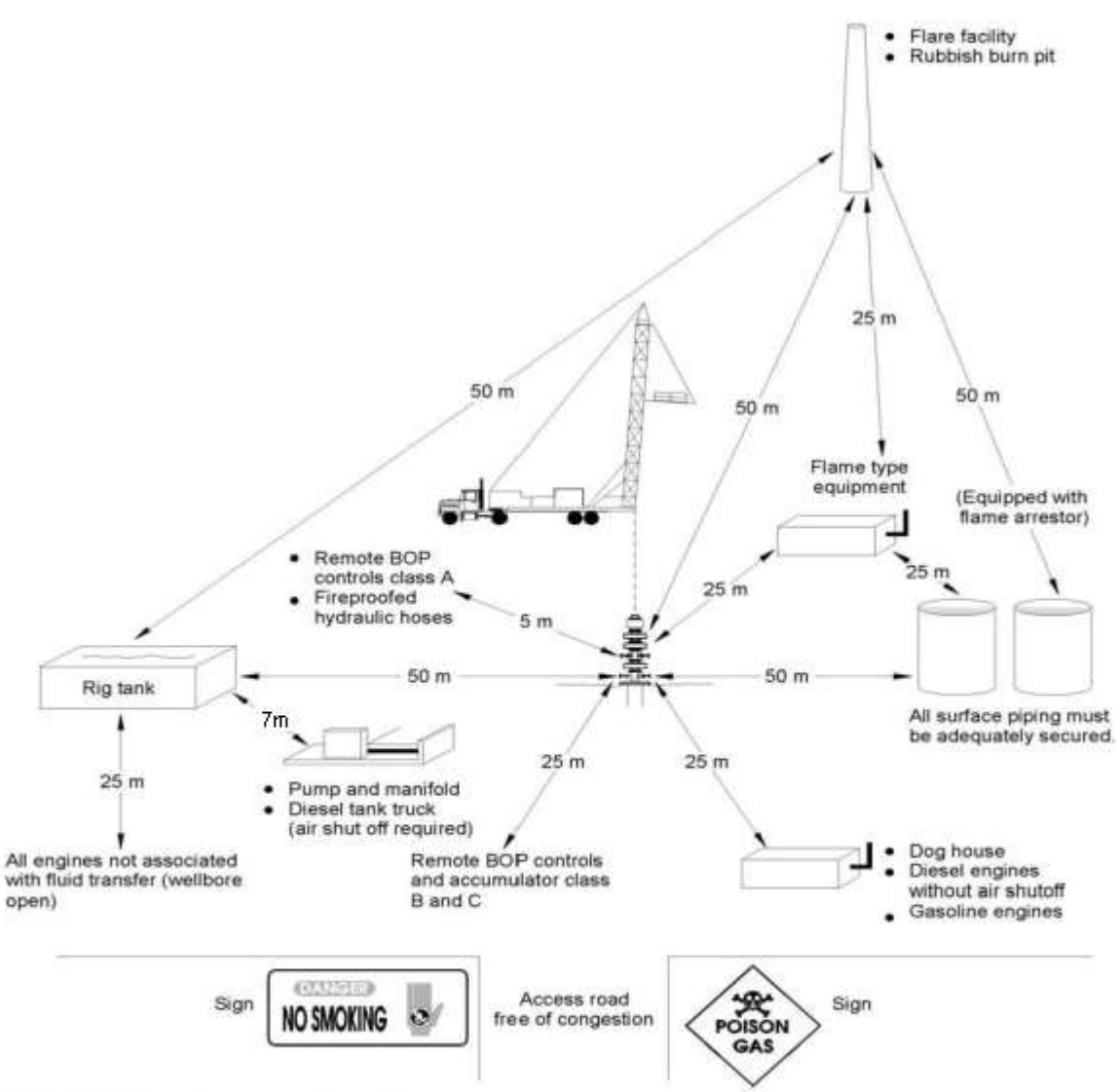
Diagram copied from the Oil & Gas Conservation Regulations, Schedule 11



Note: The doghouse and light plant must be positioned in accordance with open flame regulations, and regulations under the *Electrical Protection Act*. All distances shown are minimum distances.

Appendix B– BC Equipment Spacing for Well Servicing

Diagram copied from OGC Application Resource Book



Notes: All distances shown are minimum distances.

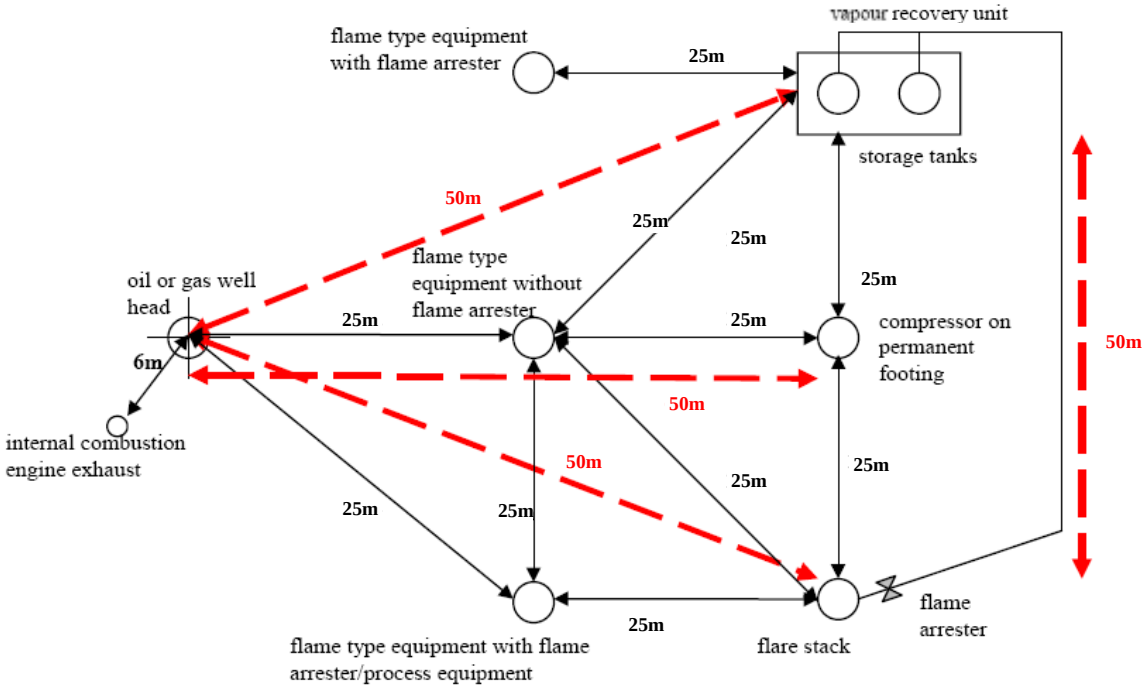
A flare pit or the end of a flare line must not be located or remain nearer than 80 m from any right of way, easement of any road allowance, public utility or building. *(Drilling and Production Regulation 65(c)(ii))*

A blackened area, free of vegetation and with a radious of at least 1.5 times the stack height, must be maintained around the base of the flare stack or the end of a flare line to the following minimum distances:

(i) 10 m in cultivated areas, and
(ii) 30 m in forested areas. *(Drilling and Production Regulation 65(n))*

Appendix C– Saskatchewan Equipment Spacing

Equipment Spacing Requirements (PDB ENV 13-S-01: Appendix 2, page 22)

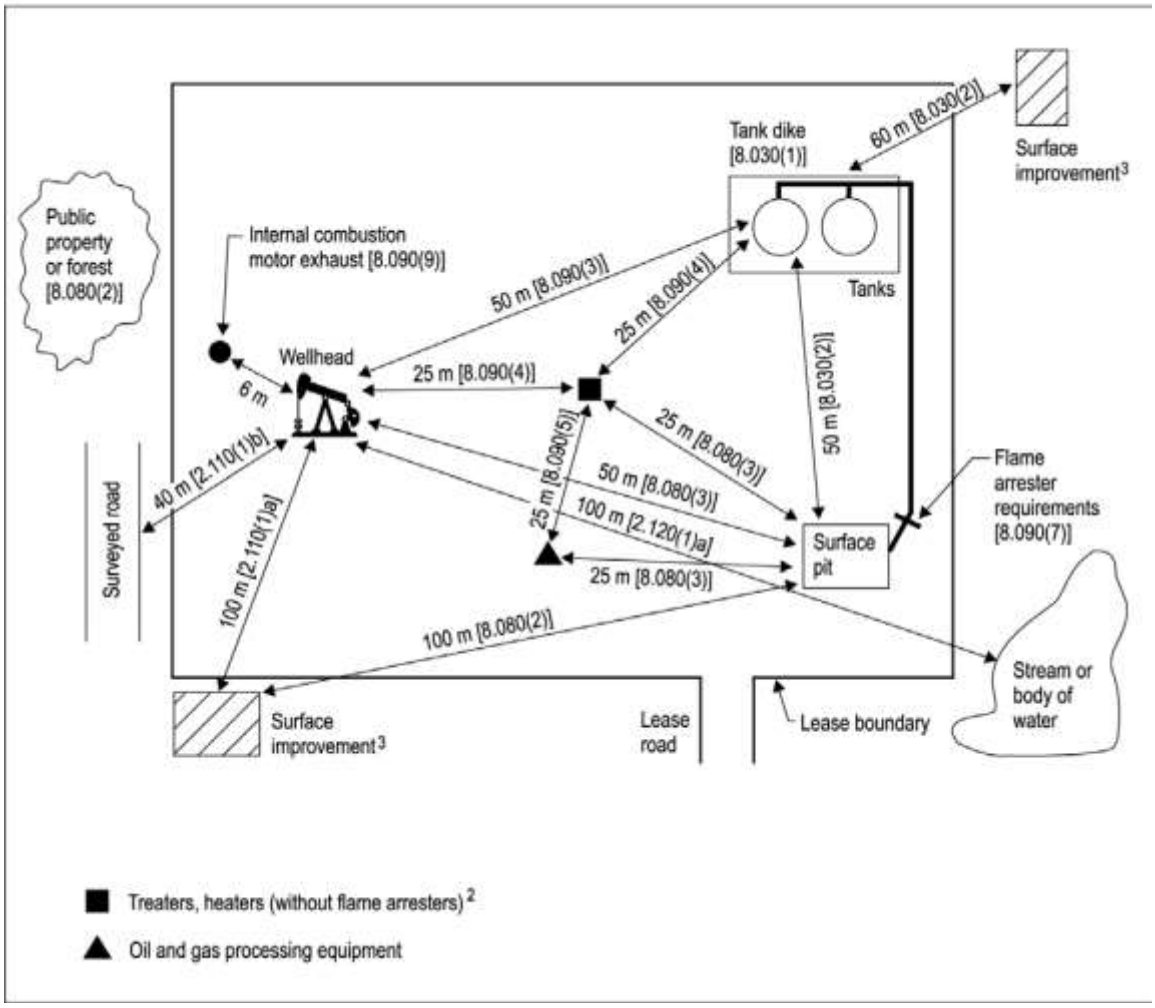


- 75 metres to a surface improvement
- 100 metres to an occupied residence or urban centre

Dashed (Red) Line = 50 metres, Solid (Black) Line = equal to or greater than 25 metres. No smoking within 25 metres of well head, separator, oil storage tank or unprotected source of ignitable vapour.

Important Note: The above diagram has been revised to show the new setback distances which are found in the amended Saskatchewan Oil & Gas Conservation Regulations (Sections 51, 52, 58, & 72) effective for equipment **installed after January 1, 2008.**

Appendix D– Alberta Equipment Spacing for Facilities



FLARE STACKS

7.0 FLARE STACKS

7.1 Introduction

The Flare Stacks Safe Operating Procedure (SOP) describes the procedures to safely depressure production, testing, pipeline facilities, etc. and to dispose of combustible by-products through a controlled burn.

Note: This SOP does not include flare stack system design, flare tanks or flare pits.

7.2 Policy

The Flare Stacks SOP applies to all Harvest Operations Corp. (Harvest) employees and contractors at Harvest facilities, worksites, or at locations where Harvest is the contract operator.

Where a Critical Task/Job Safety Analysis (JSA) has been written that follows the minimum components of, and meets the intent of the criteria in this practice, it shall take precedence over specific requirements herein.

Note: Should situations arise which are not adequately covered in this SOP or other reference manuals, bring it to the attention of the Harvest Worksite Supervisor.

7.3 Regulatory Requirements, AER Directives and IRPs

This SOP is based primarily on the Alberta, British Columbia Occupational Health and Safety Codes and Regulations with information included from other government agencies, CSA/API standards, and industry best practices.

Harvest expects all workers and contractors to follow and work in compliance with the following legislation for the jurisdiction in which they operate which includes:

- **a)** **Alberta Occupational Health and Safety Code (2009)** Part 10 Fire and Explosion Hazards, and extracts from other relevant Parts
- **b)** **Alberta Oil/Gas Conservation Regulations (2009)** Section 8.080 Burning Vented Gas
- **c)** **Alberta Forest and Prairie Protection Regulations (2008)** Oil and Gas Precautions
- **d)** **British Columbia Occupational Health and Safety Regulations (to July 2009)** Part 4 General Conditions, Part 23 Oil and Gas, and extracts from other relevant Parts
- **e)** **British Columbia Drilling and Production Regulation (2004):** Section 62 Fire Control

f) **Saskatchewan Occupational Health and Safety Regulations (to 2007)** Part 25 Fire and Explosion Hazards, and extracts from other relevant Parts
g) **Saskatchewan Energy and Resources:** Oil and Gas Conservation Regulations, and Standard S-01 Saskatchewan Upstream Storage Standards
h) **Energy Resources Conservation Board (AER):** Directive 060 Flaring, Incinerating, and Venting
i) **Enform** IRP #2 Completing and Servicing Sour Wells; IRP #18 Fire and Explosion Management; IRP #20 Well Site Design Spacing Recommendations.

7.4 Responsibilities and Duties

7.4.1 Superintendents, Field Foremen, Lead Operators

Superintendents, Field Foremen, Lead Operators are responsible for:

a) Ensuring the Flare Stacks SOP is implemented and followed at all facilities and worksite locations in their area of responsibility.
b) Selecting approved contractors that provide inspection and maintenance services of flare systems. Selecting the type of flare gun permitted on Harvest worksites.
c) Ensuring relevant training has been provided to workers who are required to maintain or light flares.
d) Ensuring routine safety checks, inspections, or audits are conducted to ensure the procedures for lighting and maintenance of flares and/or other control measures are being followed.
e) Ensuring there is a system in place to distribute new regulatory requirements for flare stacks and flame arrestor testing.

Note: Additional support and resources will be made available by the EH&S team.

7.4.2 Worksite Supervisor and/or Designated Alternates

The Worksite Supervisor is responsible for:

a) Ensuring potential hazards associated with lighting flares and flame arrestor testing are identified, communicated to workers, and that control measures are in place.
b) Ensuring the flare is maintained and inspected as per government regulation, company policy, a Critical Task/JSA, or the manufacturer's instructions.
c) Issuing a Safe Work Agreement for all work on the flare system.
d) Participating in the development and implementation of Critical Task/JSA's for the lighting or operation of a flare tip, flare stacks, or flare line used at a worksite under their supervision.
e) Ensuring flares are located and remain outside hazardous locations and specified clearance distances as per regulatory requirements.

f) Ensuring nearby residents who may be affected by any flaring procedures and/or flaring activity are notified as per AER or provincial regulatory requirements prior to undertaking such operations.
g) Notifying the AER, the BC OGC, the SK SE&R Field Offices and their respective provincial environment spill/accidental release call centres as per spill reporting requirements and Harvest's Emergency Response Plan (ERP).
h) Ensuring workers are wearing and using the PPE identified in the site specific orientation & hazard assessment and/or Critical Task/JSA.
i) Ensuring warning signs are maintained and replaced when necessary.
j) Ensuring the area surrounding the flare stack is kept clear of debris or combustibles.
k) Checking and confirming the competency of workers required to light flares and test flame arrestors.

Competent, in relation to a person, means adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

7.4.3 Workers

All workers who are required to light or maintain flares are responsible for:

a) Following this SOP, a Critical Task/JSA, or the manufacturer's instructions when required to light or perform maintenance on flare stacks.
b) Complying with the conditions and PPE requirements identified in the site specific orientation & hazard assessment, the Critical Task/JSA, or recorded on the Safe Work Agreement.
c) Reporting to the Worksite Supervisor any spills, odour, incidents, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

7.5 Training

Harvest workers whose job responsibilities and duties include lighting or maintaining flares will receive on-the-job training on this practice and the written procedures in the Critical Task/JSA.

Note: Prior to lighting any flame-type equipment or conducting flame arrestor testing, a worker must first demonstrate their competency to the Worksite Supervisor.

7.6 Hazards

Hazards associated with flare stacks include but not limited:

- Fire and explosion
- Radiant heat
- Soot carry-over
- Sprays
- Odours affecting adjacent landowners
- Manual ignition of flare stacks
- Plugged flame arrestors

7.7 Additional PPE Requirements

Additional PPE that may be required when lighting or maintaining flares may include:

- Hearing protection
- Personal monitor
- Fire-resistant clothing (required at all live Harvest worksites)
- Respiratory protection

7.8 Safe Work Agreement

A site specific orientation & hazard assessment must be conducted; a pre-job safety meeting held; and a Safe Work Agreement for hot work must be issued for the lighting of flares or performing maintenance work involving flare stacks and lines (non-Harvest personnel and equipment).

Note: Check for a flare-related Critical Task/JSA at the worksite or facility.

7.9 General Safe Operating Procedures

a) Prior to starting work, always check area around the flare stack for Lower Explosive Limit (LEL).

b) Ensure the flare stack system design is in serviceable condition. Immediately after firing off the flare, step back from the stack, observe the ignition, and be ready to respond should the cartridge catcher fail where there is one in place.

c) Where flare guns are required for operational purposes, develop and implement a procedure for safely transporting and using flare guns.

d) Follow firearm safe handling procedures when using flare guns. A torch made from oily rags is not an approved lighting method.

7.10 Positioning of Flare Stacks

Flare stacks shall be located no less than 50 metres from a well, rig/production/test tank or the boundary of any class of hazardous location as defined by the Canadian Electrical Code or as specified in the regulations for the jurisdiction in which they are located. For other standards, such as API 520/521 and Engineering Standards, refer to the construction of pressure relief systems and flare stacks.

Provincial regulations related to forested areas or surface improvements and the requirements for spacing/clearance distances must be followed.

Note: See Equipment Spacing Requirements for Alberta, BC and SK in the Appendices.

7.11 Flare Stack Perimeter Boundaries

For each site that has a flare stack, an engineer will determine the appropriate boundary around each stack based on the design parameters of the stack and the properties of the hydrocarbon stream that will be flared. Potential for liquid carry-over, population density, and proximity of vegetation must be considered.

7.12 Working Within the Flare Boundary

Before any work commences, the risks must be managed as follows:

a) Test the atmosphere. The Worksite Supervisor will decide if continuous monitoring is required.
b) The facility must be under normal operating conditions with no planned flaring.
c) Should flaring begin while working, leave immediately

7.13 Controlled Flaring

During the course of normal operations, it is often necessary to flush lines or vessels and depressure systems through the flare.

Ensure nearby residents who may be affected by any flaring procedures and/or flaring activity are notified as per AER or provincial regulatory requirements prior to undertaking such operations.

Note: To minimize the risk of fires, avoid flaring when conditions are hot and dry.

7.14 Flare Stack Pilot and Burner

For any flare stack, keep the pilot and burner assemblies in good operating condition. To reduce the risk of carry-over of unburned carbon particles, adjust the pilot flame accordingly or ensure that the pilot auto ignition systems are operating properly.

7.15 Temporary Well Test and Flare Lines

a) Ensure flare and test lines are properly secured.
b) Place appropriate warning signage around high-pressure lines as required.
c) Install “whip check” cables on flare lines that are assembled with hammer union connections.
d) Ensure high-pressure lines or hoses (e.g., pumping) are suitably secured as per applicable regulations.
e) Place flare stacks 50 metres from the wellhead, rig tanks, production tanks, etc., or as per applicable equipment spacing regulations. See the Appendices for spacing requirements.
f) Direct relief valve discharge lines away from workers to reduce the risk of fire and explosion.

7.16 Flare Gun

a) Where flare guns are required, a written procedure must be developed for the transport, storage, and operation of this equipment.
b) An approved and commercially made flare gun must be used.
c) A flare gun must always be used from the upwind side. Advance to flare stack only as far as necessary to project your flare cartridge into the flare plume.
d) Where installed the flare launch tube must be utilized.

Note: Escaping gases from flare lines will settle and spread over a wide area, especially during still atmospheric conditions.

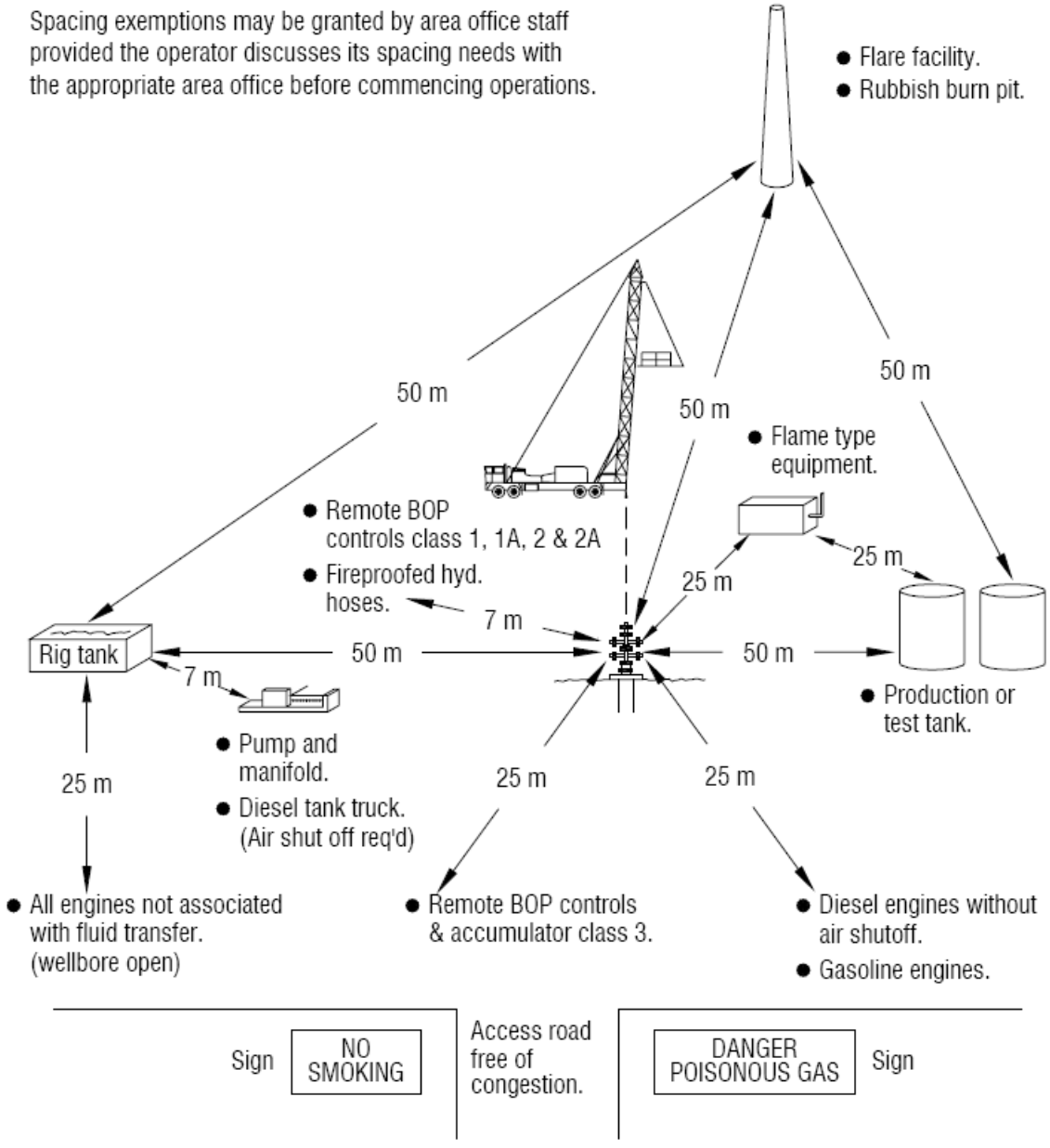
7.17 Flame Arrestors

a) Where flame arrestors and detonation arrestors are used on a flare system, a written JSA must be developed to ensure the flame arrestor/detonator will not plug or freeze.
b) Flare stacks with flame arrestors/detonators need a scheduled cleaning, as part of a preventative maintenance program. Typically spare cells and gaskets are purchased and then swapped out, so they can be cleaned away from the site in the controlled area. The cleaning frequency will depend on the condition of the flame arrestor cells during scheduled maintenance and adjusted accordingly.
c) The well site will be shut in and the flare system purged and isolated by double block and bleed or blinding/blanking when performing maintenance on the flare system.
d) The distance between the flame arrestor/detonator and the stack tip is found in the manufacturer’s manual and specifications.

Note: Flame arrestors and flame detonators are not the same piece of equipment and each has its own operating requirements.

Appendix A – Alberta Equipment Spacing for Well Servicing

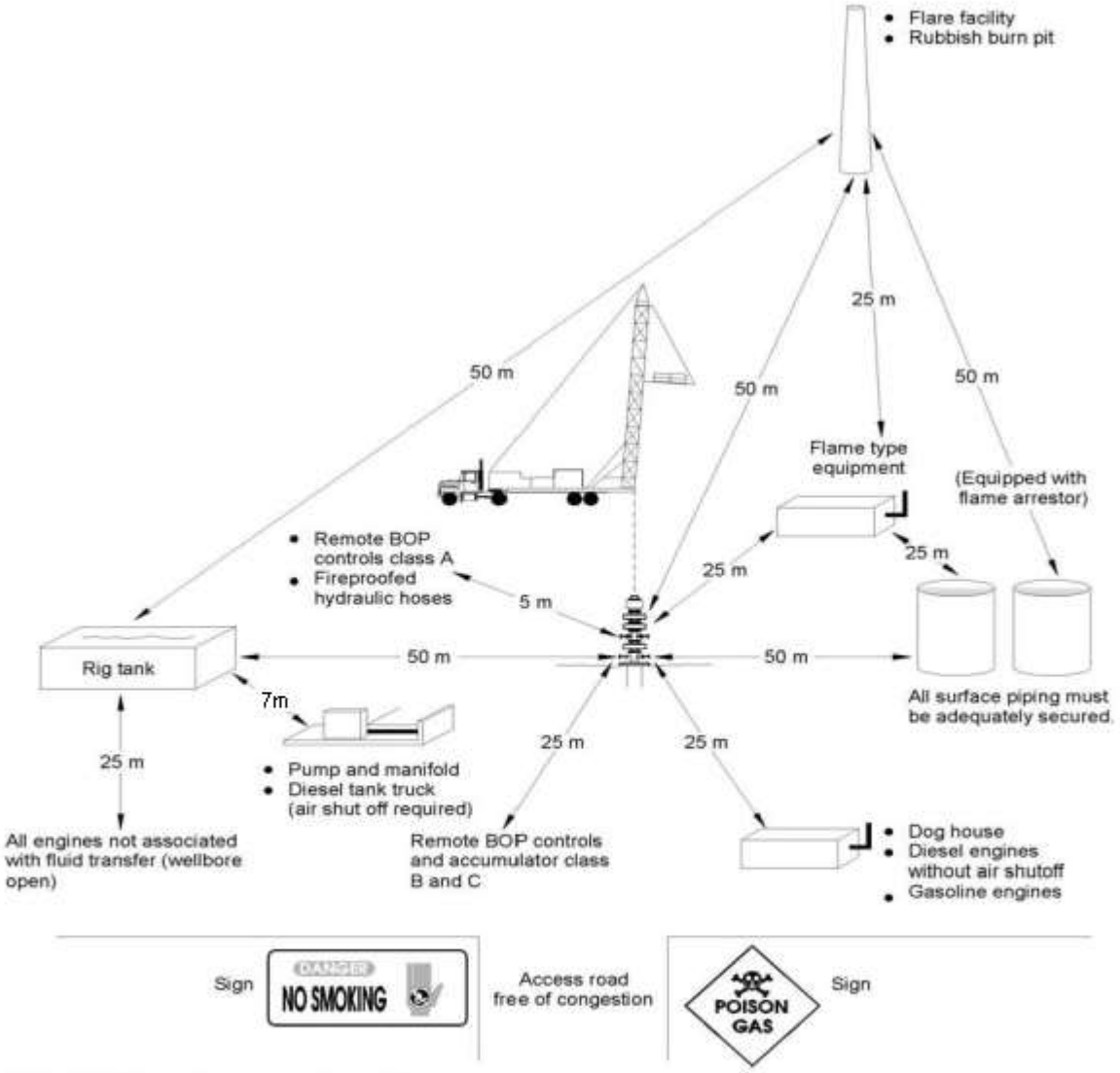
Diagram copied from the Oil & Gas Conservation Regulations, Schedule 11



Note: The doghouse and light plant must be positioned in accordance with open flame regulations, and regulations under the *Electrical Protection Act*. All distances shown are minimum distances.

Appendix B – BC Equipment Spacing for Well Servicing

Diagram copied from OGC Application Resource Book



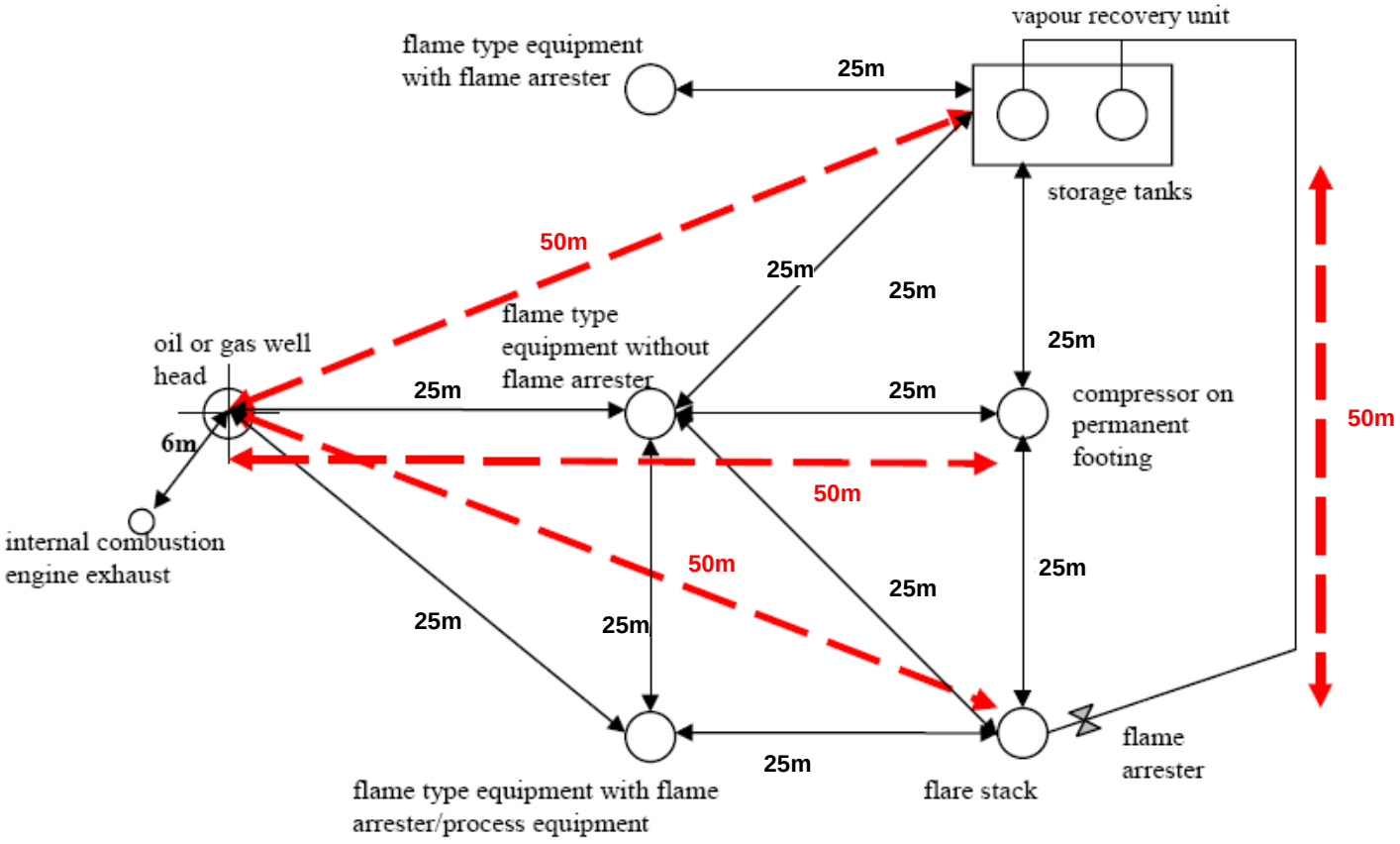
Notes: All distances shown are minimum distances.

A flare pit or the end of a flare line must not be located or remain nearer than 80 m from any right of way, easement of any road allowance, public utility or building. *(Drilling and Production Regulation 65(c)(ii))*

A blackened area, free of vegetation and with a radious of at least 1.5 times the stack height, must be maintained around the base of the flare stack or the end of a flare line to the following minimum distances:
(i) 10 m in cultivated areas, and
(ii) 30 m in forested areas. *(Drilling and Production Regulation 65(n))*

Appendix C – Saskatchewan Equipment Spacing

Equipment Spacing Requirements (PDB ENV 13-S-01: Appendix 2, page 22)



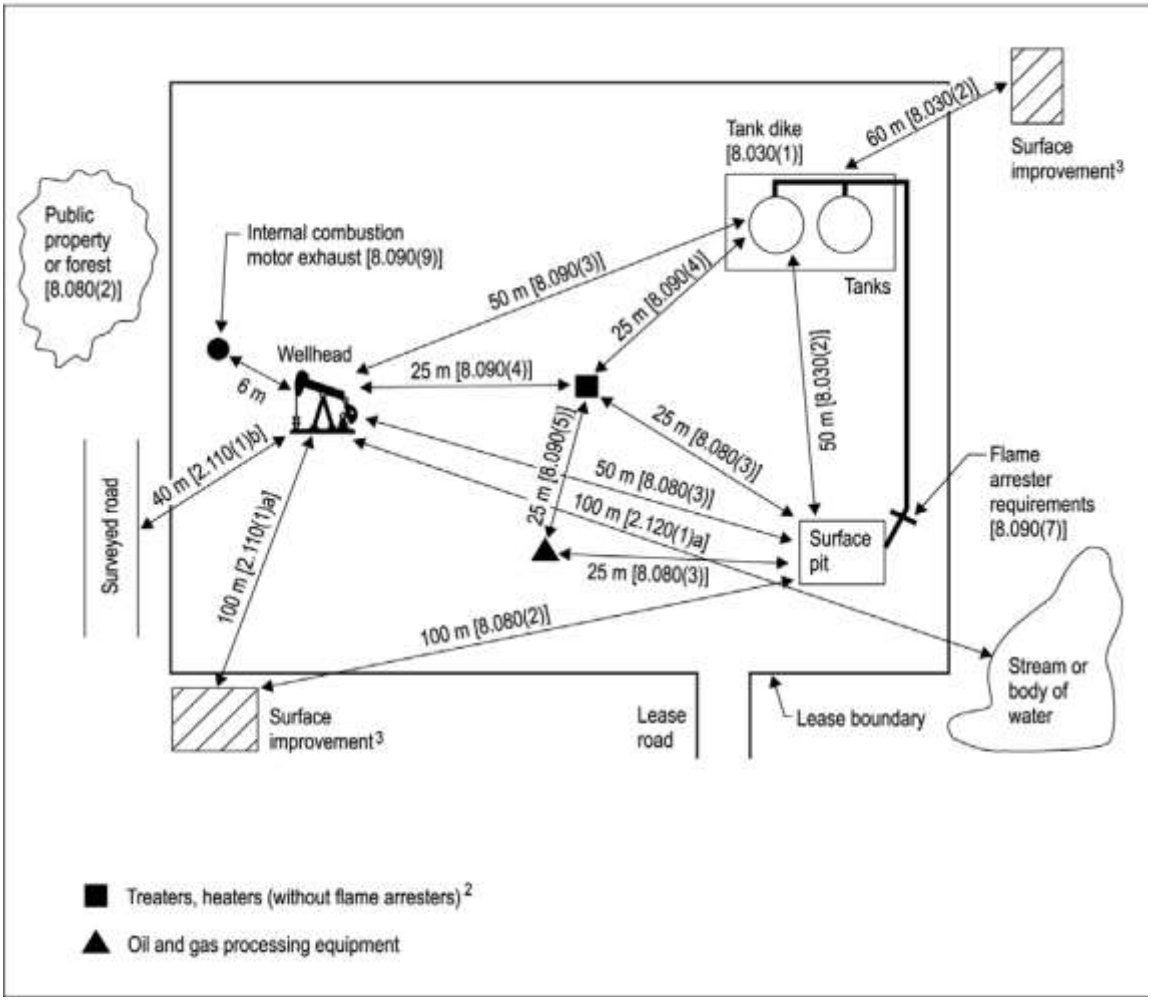
- 75 metres to a surface improvement
- 100 metres to an occupied residence or urban centre

Dashed (Red) Line = 50 metres, Solid (Black) Line = equal to or greater than 25 metres. No smoking within 25 metres of well head, separator, oil storage tank or unprotected source of

Important Note**:** The above diagram has been revised to show the new setback distances which are found in the amended Saskatchewan Oil & Gas Conservation Regulations (Sections 51, 52, 58, & 72) effective for equipment **installed after January 1, 2008.**

Appendix D – Alberta Equipment Spacing for Facilities

UPDATE: add the new version of the diagram from BCOGC.



GROUNDING & BONDING

8.0 GROUNDING & BONDING

8.1 Introduction

This Guide for Protection against Ignitions Arising out of Static, Lightning and Stray Currents is intended to be used in conjunction with the Canadian Electrical Code, Part 1. The Guide covers certain construction requirements and features that must be addressed to ensure the prevention of hydrocarbon ignition associated with the loading and unloading of storage tanks, as well as the activities associated with meter proving units where fluid is circulated through a portable truck mounted unit. Efforts can then be directed toward making any necessary changes to installations in order to gain acceptance by the local inspection authorities charged with enforcing Code rules and regulations aimed at achieving safe installation associated with the storage, loading, unloading, sampling and measuring of flammable fluids.

The Alberta Occupational Health & Safety Code (2006) states:

Part 10 – Fire and Explosion Hazards

Procedures and Precautions

(2.1) if the work requires that the contents of metallic or conductive containers be transferred from one container to another, an employer must ensure that static electricity is controlled while the contents are being transferred.

Protective procedures and precautions in hazardous locations

(3) An employer must ensure that in a hazardous location,

a) Equipment used will not ignite a flammable substance, and
b) Static electricity is controlled;

i.) In the case of conductive containers for flammable or combustible liquids while the contents are being transferred, by electrically bonding the containers to one another and electrically grounding them, and
ii.) In other cases, by some other effective means

8.2 Scope

This Work Instruction is intended to provide guidelines for engineering firms and field operations to achieve the safety requirements associated with the installation and operation of storage tanks and for an installation to be accepted for use by Harvest Operations Corp. (Harvest).

While the Canadian Electrical Code does not directly address the grounding and bonding requirements of petroleum storage tanks all grounding and bonding systems shall be designed in accordance with the Canadian Electrical Code, Sections 10 and 36, as well as the applicable rules in section 18.

The purpose of the ground system is as follows:

a) To provide a low impedance path to ground for ground fault current, lightning discharges, static electricity, and other electrical disturbances so that energy released can be safely dissipated;
b) To keep potential difference between nearby metallic surfaces at a minimum;
c) To eliminate shock hazard;
d) To prevent the build up of static electricity;
e) To allow protective devices to operate correctly;
f) To ensure that sensitive electronic equipment will operate reliably;
g) To shield instrument and control signals from electromagnetic and electrostatic interference.

8.3 Acronyms/Abbreviations, Definitions and Reference Documents

8.3.1 Acronyms/Abbreviations

- API – American Petroleum Institute
- CEC – Canadian Electrical Code -20th Edition

8.3.2 Definitions

Arc: A low voltage, high current electrical discharge that occurs at the instant two points, through which a large current is flowing, is separated. Technically, electrostatic discharges are always sparks, not arcs.

Bonding: The practice of providing electrical connections between isolated conductive parts of a system to preclude voltage difference between the parts. A bond resistance as high as one megaohm is adequate for static dissipation .For stray current protection, lightning protection, and other electrical systems, the bonding resistance needs to be significantly lower, no more than a few ohms.

Closed Connection: A connection in which contact is made before flow starts and is broken after flow is completed (e.g., in bottom loading of tank trucks).

Combustible liquid: A liquid with a flash point at or above 38ºC

Flammable liquid: Liquid having a flash point below 38ºC, and having a Reid vapor pressure not exceeding 276 kPa (40 psia)

Grounding: The practice of providing electrical continuity between a fuel handling system and ground or earth to ensure that the fuel handling system is at zero potential. A resistance as high as one megaohm is adequate for static dissipation .For stray current protection, lightning protection, and other electrical systems, the resistance needs to be significantly lower.

High vapor pressure products: Liquids with a Reid vapor pressure above 4.5 psia. These products include aviation and motor gasoline and high vapor pressure naptha.

Intermediate vapor pressure products: Flammable liquids with a Reid vapor pressure below 4.5 psia and a closed cup flash point of less than 38°C. These can form flammable vapors at ambient operating temperatures. Examples of these include commercial aviation fuel (Jet B), and solvents such as xylene, benzene and toluene.

Low vapor pressure product: Liquids with closed cup flash points above 38°C. Examples of these products include heating oil, kerosene, diesel fuel, and safety solvents.

Spark: A spark results from the sudden breakdown of the insulating strength of a dielectric (such as air) that separates two electrodes of different potential.

Splash Filling: The practice of allowing fuel to free fall or to impinge at a high velocity on a tank wall, tank bottom, or liquid surface while loading.

Spray Deflector: A plate above the vessel inlet opening that that prevents upward spraying of product and minimizes the generation of a charged mist.

Static Accumulator: Unless otherwise stated in the body of the recommended practice, a static accumulator is a liquid with a conductivity of less than 50pS/m.

Switch Loading: The practice of loading a low vapor pressure product into a tank which previously contained a high or intermediate vapor pressure product, resulting in a flammable atmosphere while loading the low vapor product.

Waiting Period: The elapsed time between the completion of product dispensing into storage or transportation containers (i.e., storage tanks, tank trucks, and tank cars) and sampling or gauging activities.

8.3.3 References

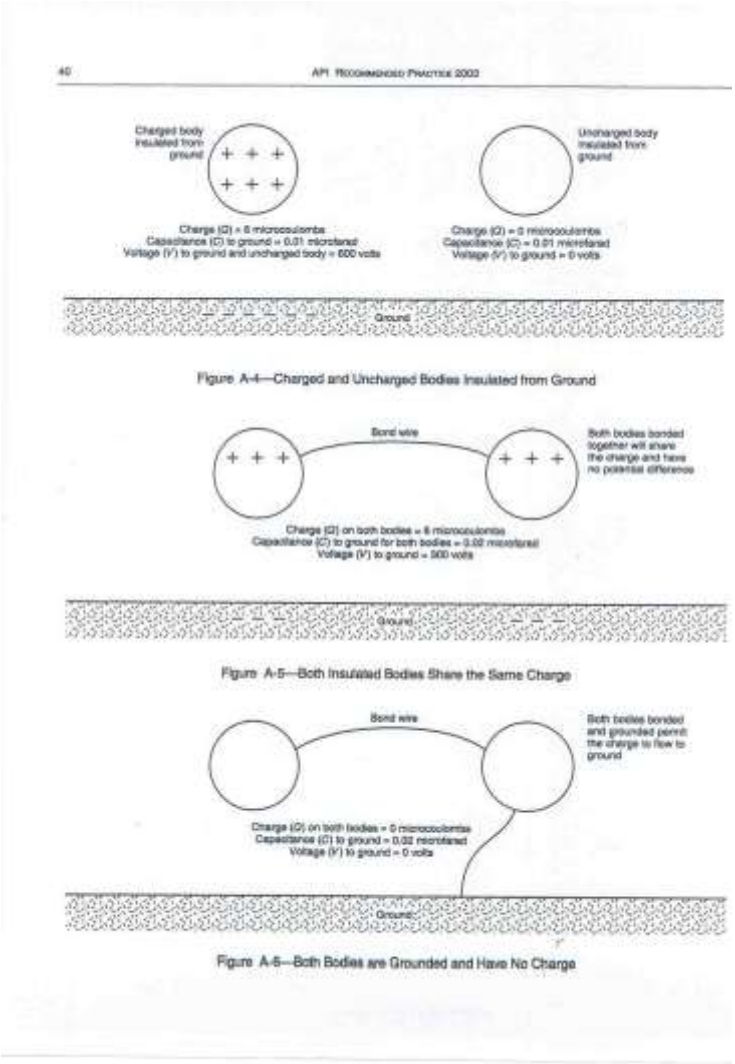
1. API -505 Recommended Practice for Classification of Locations for Electrical installations
2. API- Recommended Practice 2003, Protection against Ignitions Arising Out of Static, Lightning, and Stray Currents
3. API Recommended Practice 540 – Electrical Installations in Petroleum Processing Plants
4. Canadian Electrical Code, Part 1 – 2006
5. Alberta Occupational Health & Safety Act, May 24 2006

8.4 Static Electricity Hazards

8.4.1 General

Of importance to the petroleum industry is the static charge resulting from contact and separation that takes place in flowing liquid. Prior to flow, the liquid contains equal quantities of positively and negatively charged ions and is therefore essentially neutral. However ions of one sign are preferentially absorbed by the surface of the container or pipe, leaving a surplus of the opposite sign in the liquid at the interface. When the liquid flows, charging occurs because the absorbed ions are separated from the free ions, which are carried into the body of the liquid by turbulence. If the tank is grounded, this charge will flow to ground, as hydrostatic charge can only accumulate on bodies that are insulated from each other and from ground. (Refer to API Recommended Practice – 2003 for further definition).

Figure 1 – Charged and Uncharged Bodies



8.4.2 Tank Truck Loading

1. Tank trucks, in which flammable vapors are likely to be present, should be electrically bonded to the downspout, piping, or steel loading rack. If bonding is to a rack, the piping, rack and downspout must be electrically interconnected. Bonding is usually achieved by means of a bond wire.

    a) The bond connection should be made before the valve/port is opened, and it should remain connected until the valve/port has been securely closed after loading is complete.
    b) Bond wires may be insulated or uninsulated. Uninsulated bond wires are easier to inspect for continuity.
    c) Bond circuit resistance should be less than 10 ohms.

2. Owners of tank trucks should have a process to inspect for the following conditions and to correct any deficiencies. Inspections should be done on a routine basis (at least monthly), and include at least the following items:
3. Ensure that conducting objects such as loose floats or screens are properly secured or removed.

    a) Ensure that measures are in place to prevent gauging rods and other conducting devices from becoming spark promoters.
    b) Ensure that the spray deflector, required for bottom loading is properly installed.
    c) Check for damage to internal tank baffles.
    d) Ensure that truck grounding systems are working properly.
    e) Ensure that bond connections are not broken or corroded.

Note: Grounding the loading system in addition to bonding provides no additional protection from electrostatic ignition, however grounding of the storage system may be necessary for electrical safety. (Installed instruments. devices, etc... as per the CEC – 2006 20th Edition).

Figure 2 – Tank Truck Bonding

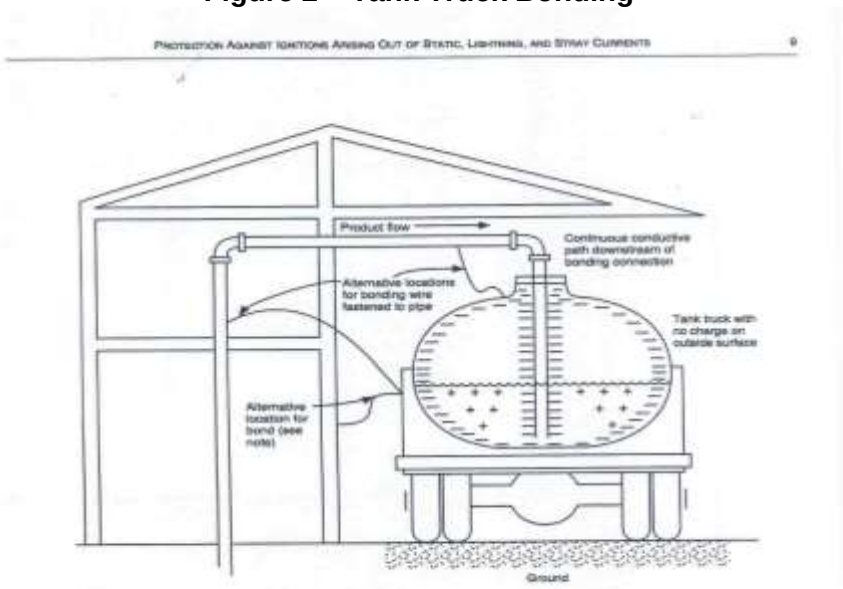


Figure 3—Tank Truck Bonding for Top Loading

8.4.3 Storage Tanks – Conductive

1. This discussion refers to conductive (metallic) storage tanks. Non-conductive tanks are discussed in section 4.4.
2. Avoid splash filling and upward spraying. The fill pipe should discharge near the bottom of the tank.
3. Limit the fill line and the discharge line to 1 meter per second until the fill line is submerged 600 mm. In the case of floating top tanks restrict the fill rate until the floating top becomes buoyant. The subsequent fill rate after the initial fill should not exceed 7 meters per second.
4. Ensure that in the case of floating top tanks, the floating roof must be in metallic contact with the shell.
5. Check for ungrounded or floating objects in the tank and remove them (e.g. Sample cans).
6. Avoid pumping substantial amounts of air or other entrained gas into the tank through the liquid. In particular, the practice of clearing fill lines by air blowing should be prohibited.
7. Care should be exercised to avoid spark promoters. A tank gauging rod, a high level sensor, or other conductive device that projects downward into the vapour space provides a place for discharge of static electricity. All of these devices must be bonded securely to the bottom of the tank by a conductive cable or rod.

8. For static dissipation, metallic tanks on grade level are considered inherently grounded. The addition of ground rods and similar grounding devices will not reduce the hazards associated with static electricity. Additional grounding may be required for electrical safety as specified in the CEC. This requirement is associated with the addition of electrical devices such as chemical pumps and tank measurement devices.

Note: As noted in the introduction to this document, Alberta Occupational Health and Safety Code – 2006, calls for grounding. For static dissipation, metallic tanks on grade level are considered inherently grounded. Metallic tanks on grade level that are in direct contact with a nonconductive membrane are not considered inherently grounded and as a result require a ground. Elevated tanks are not considered inherently grounded and require a ground in all circumstances.

8.4.4 Storage Tanks – Non-Conductive

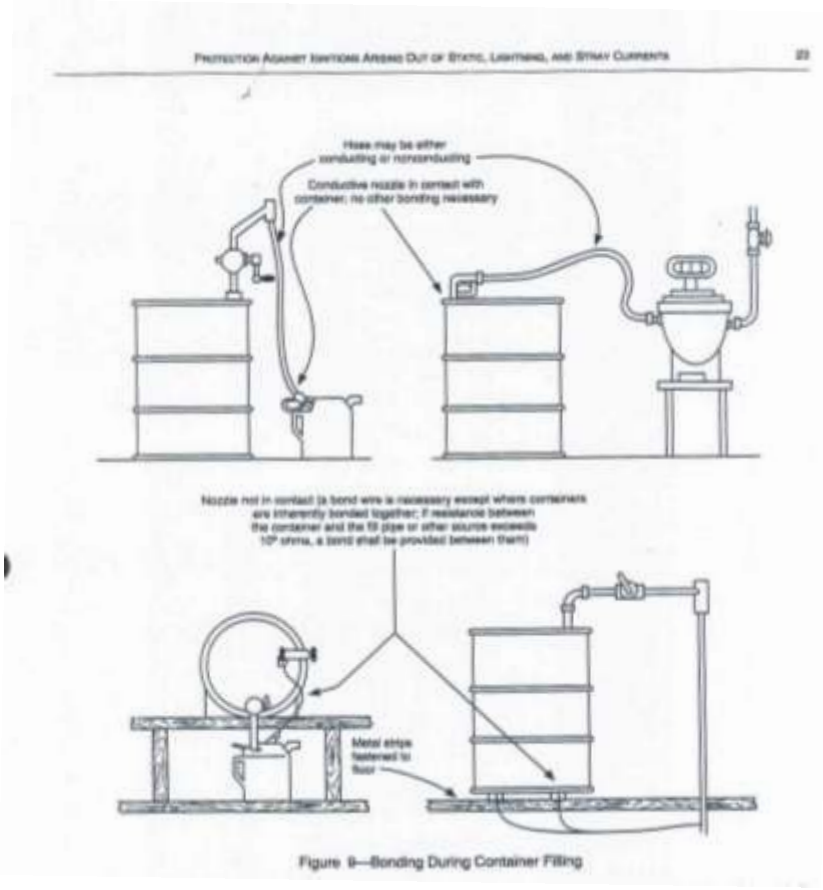
1. It is not recommended to store flammable liquids in non-conductive (e.g. plastic, fibreglass) aboveground tanks. A plastic tank may be equipped with a metallic manhole and fluid openings. When non-conductive tanks are used for hydrocarbon storage or materials that may be contaminated with flammable products, significant electrostatic concerns are introduced. These major concerns are as follows:

    a) The electrostatic field is not confined to the interior of the compartment; and
    b) There is no efficient means for charge dissipation from the fluid.

2. The following features must be incorporated in the tank if the atmosphere could be flammable:

    a) An enclosing grounded conductive shield to prevent external discharges.
    b) The tank should have a metal plate with a surface area no less than 194 cm2 per 379 litres (30 in2 per 100 gallons) located at the tank bottom, and bonded to an external ground.
    c) When used to store high conductivity products, either provide a grounded fill line extending to the bottom of the tank or an internal grounding cable extending from the top to the bottom of the tank and connected to an external ground.
    d) All metallic components such as downspouts, portholes and other metal parts must be bonded to the fill pipe which must be grounded.
    e) All downspouts must be designed to minimize splashing and spraying.

Figure 3 – Bonding During Container Filling



8.4.5 Vacuum Truck Operations

1. Explosions and fires could occur during vacuum truck operations because of the following risk factors:

    a) Ignition of a flammable atmosphere in the container being vacuumed.
    b) Ignition of flammable atmosphere generated in the areas around the vacuum truck or equipment being vacuumed.
    c) Ignition of a flammable atmosphere inside the vacuum truck.

2. The following precautions should be taken if there is risk of a flammable atmosphere during vacuum truck operations:

    a) Use conductive vacuum hose and fittings. If non-conductive hoses (not recommended) are used, ensure that all conductive fittings are bonded. The bonding must be checked before every use to ensure that the bonding circuit is intact.

b) Thin wall, spiral wound hose should not be used.
c) The complete system needs to be bonded so that there is a continuous path from the truck, through the hose and nozzle to the tank. Bonds should not be broken until all transfer equipment (hose) has been withdrawn from the container opening.
d) Avoid the use of unbonded non-conductive items such as funnels. Portable, nonconductive containers should not be used as an intermediate collection vessel during vacuum truck operation
e) Ground the vacuum truck prior to each operation.

8.5 Lightning

8.5.1 General

The information in this section is based upon the present state of the art of protection against direct stroke lightning and indirect lightning currents. The most significant property of lightning is its complexity. There is no such thing as a standard lightning stroke. In general lightning varies with terrain, altitude, latitude and time of the year. All of these variations need to be considered when considering the risk posed by lightning and the design of a lightning protection system for any specific location. Even when all known precautions are employed, prevention or safe dissipation of direct stroke lightning can not be assured.

8.5.2 Direct Stroke Lightning

Direct stroke lightning can severely damage objects in its path as a result of heat energy and associated mechanical forces, as well as direct ignition of flammable materials. The electric current and energy deposited by a lightning stroke can be sufficiently high to melt thin metallic components and destroy electronic components if they are not designed to propagate to ground or to divert the energy.

8.5.3 Indirect Lightning

The abrupt change in the electrical field caused by a lightning stroke can cause secondary sparking at equipment that is relatively remote from direct stroke. These induced charges or sparks usually occur when an insulated metallic body is present. The metallic body initially becomes charged by means of induction at a harmlessly slow rate through its high resistance to ground. When lightning strikes nearby, this induced charge is suddenly released in a discharge to ground, which can ignite a flammable mixture.

Protection of Specific Equipment against Lightning

1. Inherent Grounding:

Metallic tanks, equipment and structures commonly found in the petroleum industry that are in direct contact with the ground, (i.e. no non-

conducting membranes) have proved to be sufficiently well grounded to provide for safe propagation of lightning strokes. However the addition of a tank liner as required by current government regulations, results in an inadequate path to ground. Where a tank liner has been installed, a direct ground is required for safe propagation of lightning strokes.

2. Atmospheric Storage Tanks

Metal tanks with fixed metal roofs and horizontal metal tanks that are maintained in good condition are generally protected from damage from direct stroke lightning and ignition of contents, if all metal components that are in direct contact (i.e. bonded)

3. Most tank explosions that have occurred have been attributed to the following:

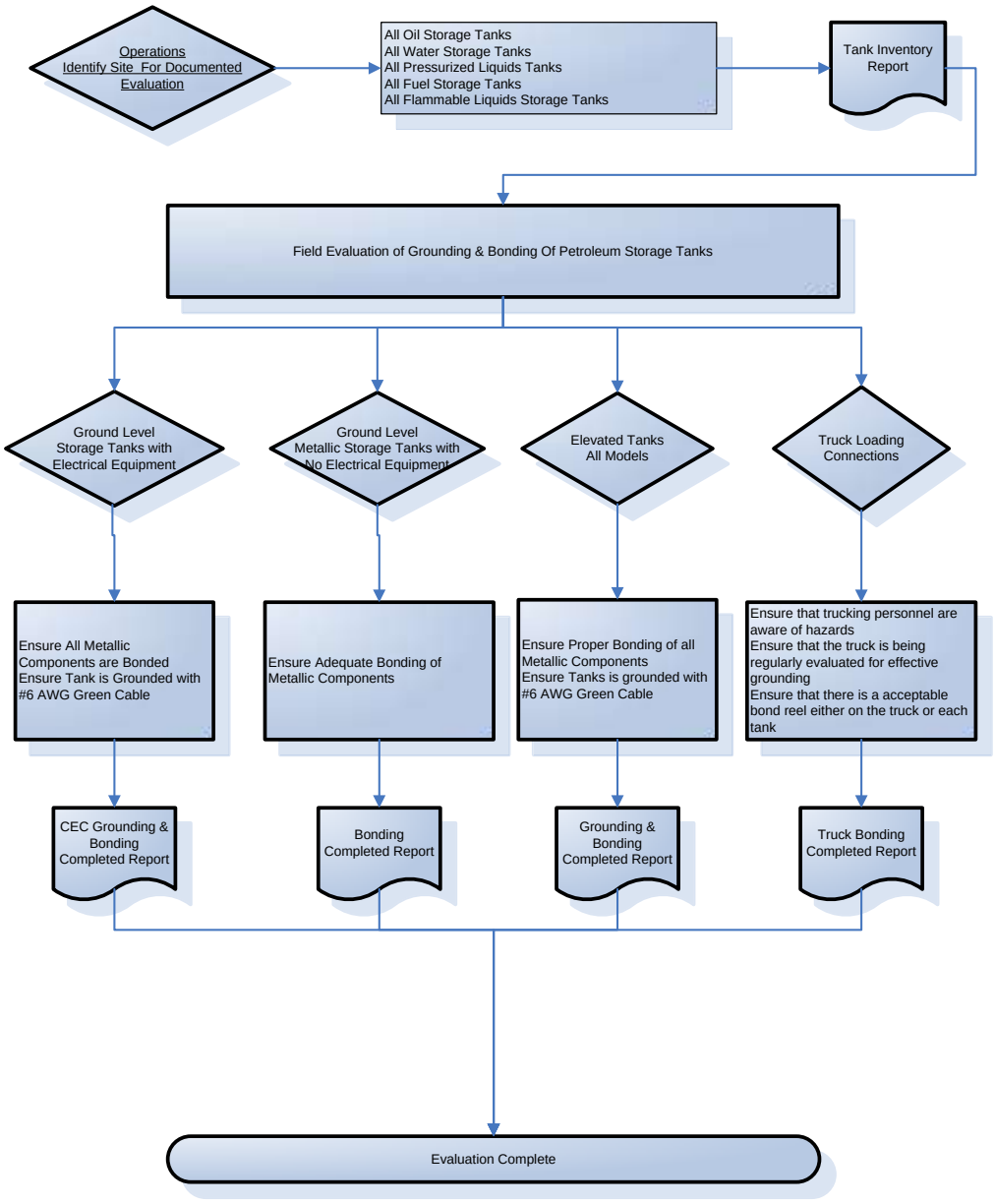
a) Roof openings that have been left open.
b) Vents that have not been protected by flashback devices, such as pressure vacuum vent valves.
c) Corrosion holes or thinned areas of tank roofs.

8.5.4 Protection against Direct-Stroke Lightning

The following steps can be taken to minimize the risk associated with lightning strikes.

1. Ensure all hatches are closed. Do not open hatches during lightning storms.
2. Ensure roofs are in good condition.
3. Provide and maintain pressure vacuum valves or back flash protection in all vents.
4. Stop tank movements (both filling and empting) during electrical storms.

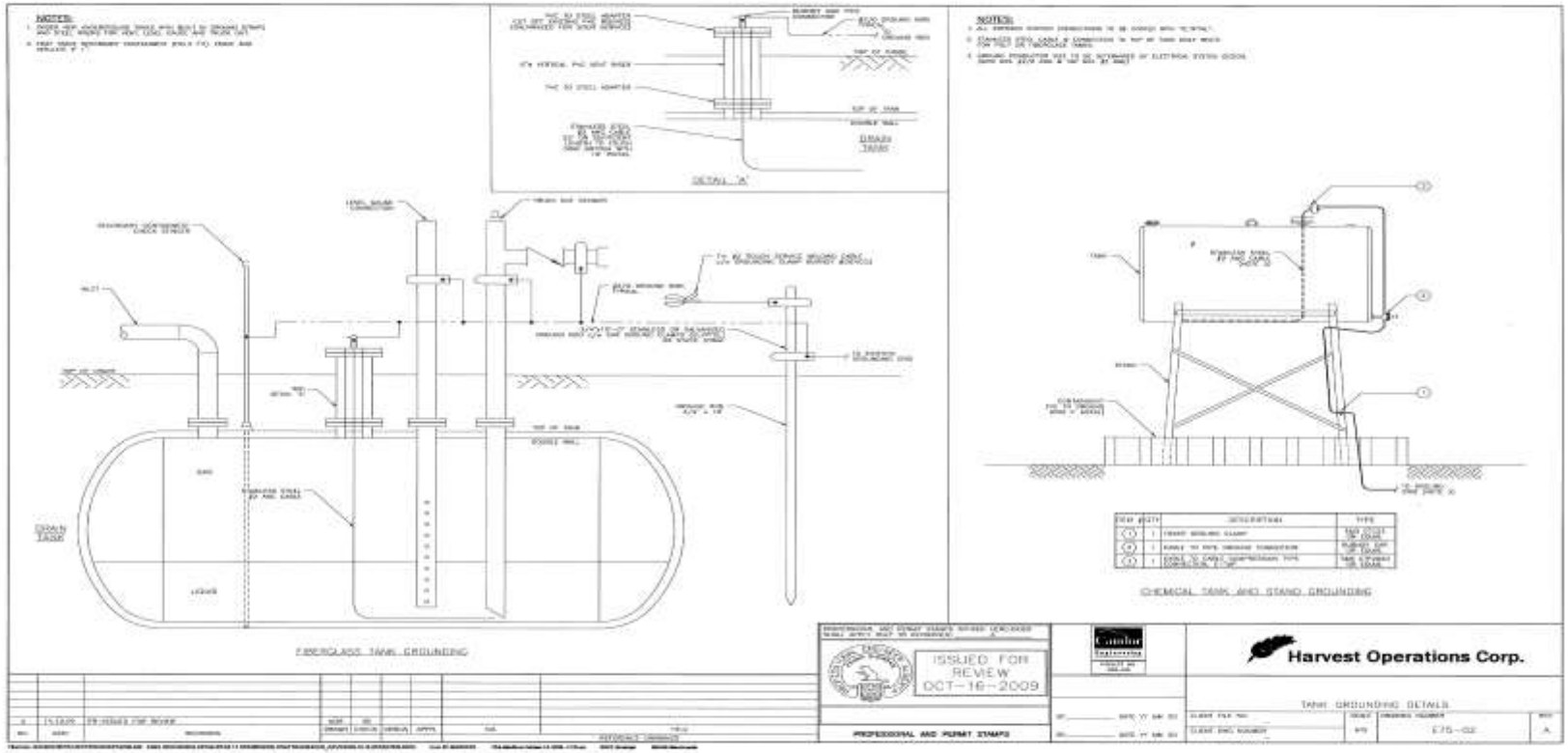
8.6 Work Flow Diagram for Field Acceptance of Bonding & Grounding of Storage Tanks



Appendix A Contact Information

Mr. Calvin Lewis
Electrical Planner
Harvest Operations Corp
4411 49 Street
Box 650
Hardisty, Alberta
T0B 1V0
780-888-2400 Extension 106

Appendix B Fiberglass Tank Bonding



HYDRATE MANAGEMENT

9.0 HYDRATE MANAGEMENT

9.1 Purpose

To ensure workers are aware of the hazards associated with hydrates and provide guidelines for the proper identification and safe removal of hydrocarbon hydrates to prevent injuries and equipment damage.

9.2 Definition

Gas hydrates are solid compounds formed by the reaction of a gas with water. Some of the light hydrocarbons that are components of natural gas form hydrates under certain pressures and temperatures, often well above 0 Celsius. These hydrates form as crystals and have a snow like appearance. In pipelines, they can pack solidly to form a restriction resulting in partial or no flow. This is referred to as “line freezing”.

9.3 Potential Hazards

Caution must be exercised when depressuring and opening a line where hydrates are suspected. The hydrates may plug the line and trap pressure as well as dissolve and release hydrocarbons and toxic gases after depressuring. Some or all of the following hazards may exist:

- extreme force
- high pressure
- propelled solids
- explosive forces
- flammable fluids
- toxic products

Note:

1. Hydrates may occur as single or multiple plugs. Hydrated lines should never be totally depressured. Pressure should only be reduced to a point below the hydrate curve.
2. The differential pressure across a hydrate can quickly accelerate a plug to high velocities, creating excessive forces of momentum. At these velocities a hydrate plug can cause serious damage at any downstream location where a restriction (control valve), obstruction (closed valve), or sharp change of direction (elbow) exists. These forces can cause serious injury if personnel are in the same vicinity.

9.4 Identification

Obstructions will reduce flow, increase backpressure on a system, and increase the differential pressure across the obstruction.

Static pressure spiking on pipeline systems is often the first indication that hydrates are beginning to form. A drop in flow should not be solely attributed to liquid hold-up; hydrates must be considered as the possible cause.

The same applies to flowing wells, particularly if the wellhead temperature and pressure is dropping. A pipeline system should not be run when hydrates are forming, unless methanol is being injected or the flowing temperature is being increased over a short period of time.

9.5 Prevention

Hydrates can be prevented and should not be accepted as normal operating routine. A hydrate prevention program is more effective than remedial removal measures.

The operator can prevent hydrate damage through better understanding about their formation. Hydrate formation can be prevented in any one of the following ways.

a) prevent free water in the gas stream by:

- dehydrating the gas, or
- elevating the temperature to vaporize the water into the vapour phase

b) increase the gas temperature above that needed for hydrate formation at the current operating pressure
c) decrease the pressure below that needed for hydrate formation at the current operating temperature
d) introduce chemical inhibitors (methanol and/or glycol)
e) redesign piping system (e.g. low points, restrictions)

9.6 Handling / Removal

Attempting to move ice plugs may rupture pipes and vessels.

Do not attempt to remove hydrates by force through increased or decreased pressure on either side of the plug.

Partially hydrated systems, in which a plug is forming but has not yet completely blocked the line, can be treated with methanol or glycol once the condition that caused the hydrate is removed.

The most effective way to disintegrate a hydrate that has completely blocked a line is to slowly reduce the pressure equally on both sides of the hydrate plug. Depressuring both sides equally

at the same rate is essential to avoid movement of the partially disintegrated plug. Depressure below the hydrate point but not to zero, in order to maintain a hydraulic cushioning effect in the line.

Note: For pipelines in particular, there may be more than one plug with full pressure trapped between them. In this situation, depressure the space between the two plugs if possible.

Prior to removal, a pre-job meeting must be conducted, including the following considerations, but not limited to:

a) Supervisor or designate must be notified when a hydrate is identified.
b) Hazards associated with hydrates, depressuring methods, communication systems, etc.
c) All piping/equipment used for depressuring will meet Industry Piping Specifications; all threaded piping is to be no more than ½" NPT. Depressuring valves must be needle or globe valves.

9.6.1 Hydrate Plug Removal from SHORT Pipelines

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PURPOSE: Prevention of Personal Injury and Equipment Damage by utilizing proper hydrate handling control measures.

Note: If there is still flow, try putting methanol / glycol into the pipeline to try and disintegrate the hydrate. Do **NOT** open or close valves suddenly, as they are not designed for the shock pressure that may occur. Special Requirements to be identified and completed at Pre-job Meeting.

SPECIAL REQUIREMENTS:	**Y/N**		**Y/N**		**Y/N**
Pre-job Meeting	**Y**	Communication System	**Y**	Protective Clothing/Gloves	
Safety Watch		Continuous Monitor		Goggles/Face Shield	
Lock Out		Respiratory Protection		Other: _____	
SCHEMATIC ATTACHED:	Yes:	No: **X**	**EQUIPMENT LIST:**	Yes:	No: **X**

PROCEDURE:

TASK STEPS / ACTIONS	CONTROLS / CONSIDERATIONS
1. Isolate line with suspected hydrate.	Isolate as close to suspected hydrate plug as possible.
2. Determine first downstream point of impact.	Check for control valves, closed valves, elbows, tees & reducers. Keep all workers clear of these areas.
3. Install pressure indicators on each end of isolated line.	Ensure gauges accurate. Always assume multiple hydrate plugs in line.
4. Depressure, "SLOWLY", both sides of plug.	Do NOT exceed 70 kPa differential, and reduce pressure in increments of a maximum 10% of normal operating pressure. This will prevent movement of the partially disintegrated hydrate plug. If pressures are fluctuating, close valves, this will stop or slow down movement of hydrate plug.
5. Reduce pressure below hydrate formation point, "BUT", not to zero.	See Engineer for Hydrate Formation Point.
6. Close bleed valves and allow hydrate time to dissipate.	Don't rush! The hydraulic effect of the hydrate plug moving against a closed valve will cushion the force of the hydrate plug.
6.a ***Checking for Hydrate Dissipation.*** Close bleed off (depressuring) valve nearest to downstream side of plug.	Ensure pressure gauges are on hydrate side of valves.
7. "Slowly" pressure up the line.	Both pressure indicators at either end of the hydrate should rise at the same rate. If they "DO NOT", the hydrate plug has only partially dissipated.
8. If hydrate plug "HAS NOT" dissipated, go back to Step 1.	Always assume multiple hydrate plugs in line.
9. If hydrate has dissipated, "slowly" put line back into service.	Slowly establish "low" flow rates to prevent remaining hydrates from attaining enough energy to cause a problem. Either add methanol or get temperature high enough to prevent further hydrates from forming.

9.6.2 Hydrate Plug Removal from LONG Pipelines

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PURPOSE: Prevention of Personal Injury and Equipment Damage by utilizing proper hydrate handling control measures.

Note: If there is still flow, then try methanol into the pipeline to try and disintegrate the hydrate!
Do **NOT** open or close valves suddenly, as they are not designed for the shock pressure that may occur.
Special Requirements to be identified and completed at Pre-job Meeting.

SPECIAL REQUIREMENTS:	**Y/N**		**Y/N**		**Y/N**
Pre-job Meeting	**Y**	Communication System	**Y**	Protective Clothing/Gloves	
Safety Watch		Continuous Monitor		Goggles/Face Shield	
Lock Out		Respiratory Protection		Other: _____	
SCHEMATIC ATTACHED:	Yes:	No: **X**	**EQUIPMENT LIST:**	Yes:	No: **X**

PROCEDURE:

TASK STEPS / ACTIONS	CONTROLS / CONSIDERATIONS
1. Isolate section of line with suspected hydrate.	Isolate smallest section of line as possible close to suspected hydrate plug.
2. Determine first downstream point of impact.	Check for control valves, closed valves, elbows, tees & reducers. Keep all workers clear of these areas.
3. Install pressure indicators on each end of isolated line.	Always assume multiple hydrate plugs in line.
4. Depressure, "SLOWLY", one end of the isolated section of line by not more than 10%.	Do **NOT** exceed 10% of normal operating pressure increments when depressuring line. If pressure indicators read the same and decrease at the same rate, the hydrate plug is not in this section.
5. Continue to move along pipeline, isolating as short of section as possible until you locate hydrate.	Watch for multiple hydrate plugs.
6. Inject or pump methanol into line, while "Slowly" depressuring other end of line.	Reduce pressure below hydrate formation point, but, "NOT" to zero. See Engineer for Hydrate Formation Point.
7. Close bleed valves and allow hydrate time to dissipate.	This will prevent rapid movement of the partially disintegrated hydrate plug and prevent damage.
8. ***Checking for Hydrate Dissipation.*** Monitor pressure indicators to determine if hydrate plug is moving.	Change in either pressure indicator, indicates the hydrate plug is moving. Continue to control the movement of the hydrate plug by controlling the rate of depressurization.
9. Close bleed off (depressuring) valve nearest to downstream side of plug.	Ensure pressure gauges are on hydrate side of valves.
10. "Slowly" pressure up the line.	Both pressure indicators at either end of the hydrate should rise at the same rate. If they "DO NOT", the hydrate plug has only partially dissipated.
1. If hydrate plug "HAS NOT" dissipated, go back to Step 1.	Always assume multiple hydrate plugs in line.
2. If hydrate has dissipated, "slowly" put line back into service.	Slowly establish "low" flow rates to prevent remaining hydrates from attaining enough energy to cause a problem. Either add methanol or get temperature high enough to prevent further hydrates from forming.

INSPECTIONS

10.0 INSPECTIONS

10.1 Introduction

Planned inspections are useful in evaluating the effectiveness of the Harvest Operations Corp. (HOC) EHSMS and in maintaining regulatory compliance. Regular inspections also provide an opportunity to identify and address worksite hazards, educate workers and improve direct communication between operations and management. This inspection guideline has been developed to ensure planned inspections are consistently conducted and documented throughout Harvest operations.

10.2 Training

All personnel that conduct planned inspections will have adequate training and experience to effectively identify deficiencies and ensure appropriate corrective action is completed.

10.3 Responsibilities

10.3.1 Harvest EHS Management Committee

a) Approve and support the inspection guideline and process
b) Review unacceptable risk deficiencies and ensure appropriate corrective action is completed
c) Audit overall compliance of the inspection process

10.3.2 District Manager/Superintendent

a) Develop annual inspection schedule according to the Inspection Frequency Chart
b) Assign inspection teams as per the Inspection Frequency Chart
c) Review completed inspections as per the Inspection Frequency Chart
d) Assign corrective actions and persons responsible, as required
e) Follow-up to ensure corrective actions have been implemented
f) Audit completed inspections

10.3.3 Area Foreman

a) Post annual inspection schedule
b) Ensure inspections are conducted according to the inspection schedule
c) Participate in inspections as per the Inspection Frequency Chart
d) Assign inspection teams as per the Inspection Frequency Chart
e) Review completed inspections as per the Inspection Frequency Chart
f) Assign corrective actions and persons responsible, as required
g) Forward completed inspections to the appropriate reviewer as per the Inspection Frequency Chart

h) Review completed inspections in safety meetings
i) Follow-up by means of safety meeting minutes action tracker to ensure corrective actions have been implemented
j) Stop work pending completion of corrective actions if deficiencies pose significant threat to health or safety of workers or the public

10.3.4 Worksite Supervisor / Consultant

a) Participate in inspections as per the Inspection Frequency Chart
b) Ensure contractor inspections are completed diligently as per the Inspection Frequency Chart
c) Ensure corrective actions are completed
d) Inform Harvest supervisor of any high risk deficiencies
e) Stop work pending completion of corrective actions if deficiencies pose significant threat to health or safety of workers or the public

10.3.5 EHS Advisor

a) Provide training and guidance regarding conducting inspections, identifying deficiencies and assessing risk
b) Participate and assist in inspections as per the Inspection Frequency Chart
c) Assign corrective actions and persons responsible
d) Ensure corrective actions are completed

10.4 Inspection Process

The following inspection process has been developed to ensure planned inspections are consistently and effectively conducted throughout Harvest operations:

a) Set the inspection schedule according to the Frequency Chart
b) Select / appoint the inspection team or person.
c) Conduct the inspection.
d) Document inspection results on the appropriate form including completion of corrective action section where appropriate.
e) Forward completed inspection report to the reviewer according to the Frequency Chart
f) Reviewer to assign corrective actions, person responsible for implementation and implementation date, if corrective action has not already been completed.
g) File completed inspection report.

10.5 Inspections

Harvest has developed a number of facility and equipment inspection, including:

a) Large Facility Inspections
b) Small Facility / Wellsite Inspections

c) Facility Pre-Start up Inspections
d) Turnaround Pre-Start up Inspection
e) Facility Winterization Inspections
f) Suspended Wells Inspections
g) Safety Equipment Inspections
h) Tank Inspections
i) Packer Isolation Inspections
j) Vehicle Inspections
k) Quad Inspections
l) Drilling Rig Inspections
m) Service Rig Inspections
n) Documentation Inspections
o) Work Agreement System Evaluations
p) Job Observations

Harvest has developed an Inspection Frequency Chart that details how often each type of inspection must be conducted and who is responsible for completing and reviewing the inspection.

10.5.1 Inspection Frequency Chart

Inspection Type	Frequency	Form Name	Inspection Team	Harvest Reviewer
Large Facility* Inspection	Annually as a minimum. Re-inspection at 90 day intervals until all actions are completed.	Facility Inspection Checklist – Detailed	Facility Operator, Area Foreman, EHS Advisor, Property Team Engineering Rep.	Area Superintendent or Manager
Small Facility / Wellsite Inspection	Annually	Wellsite or Small Facility Inspection Checklist	Area Operator	Area Foreman
Cranes & Hoists	As per the manufactures' specifications	N/A	3rd Party Certified Services	Area Foreman
Facility Pre-Startup Inspection	As required for new and/or modified facilities	Facility Pre-Startup Inspection Checklist	Project Coordinator, Area Operator and EHS Advisor	Area Foreman
Turnaround Pre-start up Inspection	As required following a turn around.	Turnaround Pre-start up Inspection checklist	Operations Representative EH&S	Area Foreman

Facility Winterization Inspection	Annually	Winter Preparation Checklist	Area Operator	Area Foreman
Suspended Wells Inspection	Annually	Suspended Well Compliance Checklist	Area Operator	Area Foreman
Safety Equipment Inspection	Monthly	Various forms included in the Preventative Maintenance (PM) Program	Area Operator	Area Foreman
Tank Inspection (Visual)	Monthly	Tank Inspection Checklist	Area Operator	Area Foreman
Packer Isolation Inspection	Annually	Packer Isolation Tests (in PM Program)	Qualified personnel	Area Foreman
Vehicle Inspection	Quarterly	Vehicle Inspection Checklist	Assigned Operator	Area Foreman
Quad Inspection	Monthly	Quad Inspection Checklist	Assigned Operator	Area Foreman

Inspection Type	**Frequency**	**Form Name**	**Inspection Team**	**Harvest Reviewer**
Drilling Rig Inspection	As per CAODC Drilling Recommended Practice	CAODC Drilling Rig Inspection Checklist	Rig Manager or Delegate	Harvest Drilling Consultant
Service Rig Inspection	As per CAODC Service Rig Recommended Practice	CAODC Service Rig Inspection Checklist	Rig Manager or Delegate	Harvest Well Servicing Consultant
Documentation Inspection	Annually in conjunction with facility inspections	Field Records Management	Facility Operator, Area Foreman, EHS Advisor	Area Superintendent or Manager
Work Agreement Evaluations	Monthly / per project basis	Work Agreement System Evaluation Record	Area Foreman or Project Coordinator, EHS Advisor	Area Superintendent
Job Observations	Monthly / per project basis	Job Observation	Area Foreman or Project	Area Superintendent

		Checklist	Coordinator, EHS Advisor	

HOC superintendents and managers are responsible for ensuring inspections are scheduled in accordance with the Inspection Frequency Chart. Wherever possible, inspections may be streamlined with the facility's preventative maintenance schedule. All facility and equipment inspection forms are provided in Forms Section or are contained in the preventative maintenance program.

Inspection requirements related to pipeline and pressure equipment operation and integrity are specified in the HOC Asset Integrity Manuals available through the HOC Intranet.

10.5.2 Large Facility Inspections

Large facilities are defined as facilities that have any one of the following components: chemical storage/handling, dehydration, oil and gas treating / separation, water disposal / flood, compression over 75 hp or multiple compressors. Detailed inspections will be completed on all large facilities on an annual basis to ensure that a consistent level of safety, emergency preparedness, hazard identification and control, and regulatory compliance is achieved in all HOC operating areas. The inspection will be completed by a team that includes the facility operator, area foreman, EHS advisor and the property team engineering representative. To prepare for the inspection, the inspection team should review the HOC EHSMS, corporate or specific ERP, JSAs and associated procedures, the Facility Inspection Checklist – Detailed, and jurisdiction regulatory requirement (i.e. ERCB Directive 64 and Directive 66).

The resulting inspection documentation will be reviewed by the area superintendent or manager, who will assist in ensuring that any required corrective actions are identified, assigned and completed in a timely manner. Large facilities must be re-inspected every 90 days following the annual inspection until all required actions are completed.

10.5.3 Small Facility / Wellsite Inspections

Small facility / wellsite inspections will be completed on an annual basis by the area operator to evaluate EHS performance and regulatory compliance. To prepare for the inspection, the area operator should review the HOC EHSMS, JSAs and associated procedures, and the Wellsite or Small Facility Inspection Checklist. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed in a timely manner.

10.5.4 Cranes, Hoists & Rigging

Maintenance and inspection frequency of cranes, hoists, and rigging must be developed and applied in accordance with the manufacturer's specifications.

10.5.5 Facility Pre-Start up Inspections

Facility pre-startup inspections will be completed by an inspection team consisting of the project coordinator, area operator and EHS advisor. Facility pre-start up inspections will be conducted prior to startup for new or modified facilities to ensure that all hazards are have been identified and adequate controls and safety equipment are installed and ready for operation before a facility comes online. Pre-start up inspections also facilitate communication between project and operations personnel to ensure that responsibility for EHS issues are appropriately delegated. To prepare for a pre-startup inspection, the inspection team should review the HOC EHSMS, JSAs and associated procedures, and the Pre-Startup Facility Inspection Checklist. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed prior to start up.

10.5.6 Turnaround Pre-Start up Inspection

Turn around pre-start up inspections will be conducted following a turnaround to ensure that all hazards are have been identified and adequate controls and safety equipment are installed and ready for operation before a facility comes online. Turn around pre-start up inspections also facilitates to communication between project and operations personnel to ensure that responsibility for EHS issues are appropriately delegated. To prepare for a turnaround pre-start up inspection, the inspection team should review the HOC EHSMS, JSAs and associated procedures, and the turnaround pre-start up Inspection Checklist. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed prior to start up.

10.5.7 Facility Winterization Inspections

Facility winterization inspections will be completed on an annual basis, prior to the winter season by the area operator. The cold climate experienced during the winter months presents additional EHS concerns such as vehicular emergencies, lease slipping hazards, equipment freezing, etc. Winterization inspections ensure that appropriate equipment and controls are in place to maintain EHS standards throughout the winter months. To prepare for the inspection, the area operator should review the HOC EHSMS and the Winter Preparation Checklist. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will work with the area operator to ensure required equipment and controls are in place before winter.

10.5.8 Suspended Well Inspections

Suspended well inspections will be completed on an annual basis by the area operator to ensure suspended wells are maintained in a safe and compliant condition. To prepare for suspended well inspections, the area operator should review the HOC EHSMS, jurisdictional well suspension requirements (i.e. AER Directive 13) and the Suspended Well Compliance Checklist. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed in a timely manner.

10.5.9 Safety Equipment Inspections

Safety equipment inspections will be completed on a monthly basis by the area operator, typically as part of the facilities preventative maintenance program. Safety equipment to be inspected will include breathing apparatus, personal monitors, fire extinguishers, eye wash / emergency shower stations, first aid kits, fall protection equipment, rescue equipment, communication equipment, wind direction indicator, etc. Safety equipment inspections ensure that protective and emergency equipment is maintained is available and is maintained in a ready to use condition. To prepare for the inspection, the area operator should review the HOC EHSMS, JSAs and associated procedures, and the location's preventative maintenance program. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed in a timely manner.

10.5.10 Tank Inspections

Tank inspections will be conducted on a monthly basis by the area operator. The inspection will involve visual examination of storage tanks and diked areas for signs of leaks and/or damage to ensure tank integrity as per regulatory requirements. To prepare for the inspection, the area operator should review the HOC EHSMS, jurisdictional storage requirements (i.e. AER Directive 55) and the Tank Inspection Checklist. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed in a timely manner.

10.5.11 Packer Isolation Inspections

Packer isolation tests will be completed on an annual basis to prove hydraulic isolation as per regulatory requirements (i.e. AER ID 2003-01). Packer isolation tests must be completed by personnel qualified through training and experience to conclusively interpret test results. Packer isolation test results will be submitted to the regulatory authority as per jurisdictional requirements. For instance in Alberta, packer isolation test results must be submitted electronically to the AER using the DDS Packer Test Reporting application by September 1st each year. Packer isolation test documentation is included in the preventative maintenance program. Test results should be reviewed by the area foreman before they are submitted to the regulatory authority. When packer isolation tests do not prove hydraulic isolation, the necessary remedial work and retest must be completed within 90 days.

10.5.12 Vehicle Inspections

HOC / contractor owned vehicles will be inspected every month (when in use) by the assigned operator / owner. The vehicle inspection ensures that vehicles are maintained in good working order and that appropriate safety equipment and supplies are available. The vehicle Inspection Checklist will be used to conduct and document the inspection. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed in a timely manner. If deficiencies to critical items (as indicated on the Vehicle Inspection Checklist) are identified, the deficiency must be corrected before the vehicle can be put back into service.

10.5.13 Quad Inspections

Harvest / contractor owned quads will be inspected every three months (quarterly) by the assigned operator / owner of the vehicle. The quad inspection ensures that quads are maintained in good working order and that appropriate safety equipment and supplies are available. The Quad Inspection Checklist will be used to conduct and document the inspection. Following the inspection, documentation will be forwarded to the area foreman for review. The area foreman will ensure that any required corrective actions are identified, assigned and completed in a timely manner. If deficiencies to critical items (as indicated on the Quad Inspection Checklist) are identified, the deficiency must be corrected before the quad can be put back into service.

10.5.14 Rig Inspections

Drilling and service rigs will be inspected by the rig manager or delegate in accordance with the CAODC Drilling and Service Rig Recommended Practices. The HOC site supervisor is responsible for ensuring that rig inspections are conducted as per the CAODC recommended practices and for reviewing inspection documentation to ensure that appropriate corrective actions are identified, assigned and implemented in a timely manner. HOC site supervisors have the authority to suspend work if a deficiency that poses a significant risk to the health or safety of the works and the public is identified.

10.5.15 Documentation Inspections

EHS documentation will be reviewed in conjunction with large facility inspections. Important EHS documentation should be available and maintained in an easily accessible manner to provide quick reference for operations personnel and for inspection/auditing purposes. The Facility Records Management form will assist the facility inspection team in identifying and locating required EHS documentation. The area superintendent or manager will review the documentation inspection to ensure that corrective actions are completed as required.

10.5.16 Work Agreement System Evaluations

The work agreement system is to be evaluated on a monthly or per project basis to ensure effective implementation of the process. The work agreement system evaluation will be completed by the area foreman or project manager in consultation with the EHS advisor. The evaluation will involve obtaining all work agreements issued at a location over the month or project, obtaining any supplemental documentation (i.e. confined space entry attachments, hazard assessment and pre-job/task meetings, etc.) and reviewing the documentation to evaluate accuracy and completeness as per the Work Agreement System Evaluation Record. Notable trends should be documented and communicated to improve the effectiveness and efficiency of the work agreement system. Evaluation records will be reviewed by the area superintendent or manager to ensure that outstanding concerns or follow-up items are addressed.

10.5.17 Job Observations

Planned job observations will be conducted on a monthly or per project basis by the area foreman, project manager or EHS advisor. Job observations are useful in evaluating the effectiveness of safe work procedures in the field. Job observations also facilitate communication of EHS issues and assist in identifying previously unrecognized or inadequately controlled hazards. Job observations involve selecting a worker and task to observe, reviewing relevant JSAs and work procedures, observing the work and recording the observations as per the Job Observation Checklist, reviewing and discussing the observations with the worker including providing reinforcement/corrective feedback, and follow-up action to improve the effectiveness and efficiency of work practices and procedures. Follow-up action may include revisions to JSAs and work procedures. The area superintendent will review job observation documentation to ensure that appropriate follow-up action is completed.

10.5.18 Ladder Inspection Program and Checklist

All portable ladders, stepladders and fixed ladders will be inspected by the Work Site Supervisor, or by a competent HOC employee, or by an approved contractor according to HOC's inspection requirements or government regulations.

10.6 Deficiencies and Corrective Actions

When deficiencies are noted during an inspection they should be risk ranked in accordance with the risk ranking matrices. The inspection team, in consultation with the reviewer as required, will assign the deficiency a risk ranking of unacceptable, medium or low. Necessary corrective actions will be identified, responsibility to implement the corrective actions will be delegated to an appropriate authority and a suitable timeline for implementing the corrective actions will be developed. The reviewer as indicated in the Inspection Frequency Chart will follow-up to ensure that corrective action is completed in a timely manner.

Deficiencies with a risk ranking of unacceptable that pose a significant risk to the health or safety of the workers or the public, work must be suspended until the implementation of corrective actions has effectively reduced the risk ranking to low. Unacceptable risk deficiencies must be reviewed by HOC management to ensure appropriate corrective action is completed.

To ensure deficiencies are addressed and corrective actions are completed, inspection results should be discussed at group safety meetings and responsibilities and progress should be documented on the Safety Meeting Minutes form contained in the Forms section.

10.7 Evaluation

Inspections are to be evaluated on a regular basis to ensure consistency and effectiveness in identifying and correcting deficiencies. Evaluation is also useful in determining how to improve the efficiency of the inspection process. Inspections will be regularly evaluated by the inspection reviewer as specified in the Frequency Table. Notable areas for improvement should be communicated to personnel responsible for conducting inspections and to management to improve and streamline the overall inspection process.

10.8 Record Keeping

All completed inspection reports including documentation of implemented corrective actions should be kept for a minimum of 3 years.

LIGHT HYDROCARBONS

11.0 LIGHT HYDROCARBONS

11.1 Introduction

This Guideline has been established to raise awareness and minimize the hazards to workers from exposures to sweet light hydrocarbons that may create toxic atmospheres causing nausea or oxygen deficiency, also known as narcosis. Along with the narcosis hazard is also the flammability hazard of any hydrocarbon gas.

Entry should not be allowed into facility buildings without testing the internal atmosphere either through fixed LEL or H_2S monitors and/or portable personal LEL/O_2 or H_2S monitors. H_2S detectors are not an acceptable means of detecting light hydrocarbon gases, as it will not alarm before the hydrocarbon gas poses an unacceptable health hazard.

This Guideline applies to all Company facilities and all personnel (employees and contractors) working in or on them.

11.2 Administration

The Site Supervisor is responsible for ensuring:

a) the site is correctly assessed to identify all areas where there is a potential for flammable or toxic gasses
b) the appropriate PPE (Personal Protective Equipment) is available
c) that all personnel are adequately trained on appropriate safety precautions to prevent exposure to unsafe concentrations of light hydrocarbons

The Site Supervisor, in consultation with the EHS Safety Advisor and Facility Engineering should identify all areas where there is a potential for flammable and/or toxic gases. (See Appendix “A”, for a list of potential explosive environments and ignition sources).

11.3 Health Hazards of Light Hydrocarbons and Exposure Limits

Light hydrocarbons accumulating in enclosed or poorly ventilated areas may create the following hazards:

a) At lower concentrations (around 10% LEL), narcosis may cause dizziness, headaches, and impair the affected person’s judgment.
b) At higher concentrations (around 20% LEL) the worker may suffer the effects of oxygen deficiency, which can lead to dizziness, unconsciousness and/or death.
c) Explosive concentrations may build up which, when ignited, can cause serious injury and/or death as well as significant loss of equipment and/or product.

Exposure limits should be set at 10% LEL for all workers. This means that all LEL monitors (either fixed or personal) should be set to alarm at 10% LEL instead of the normal 20% LEL.

The shut downs may remain the same as they are based on the explosive range of the gases. (See Appendix “B” - for Explosive / Flammability Ranges).

Note: Handling cold light hydrocarbon liquids also presents a hazard. Freezing burns may result from liquid contact with unprotected tissue.

11.4 Training

The Site Supervisor will ensure that all workers (including contractors) are trained and familiar with this Guideline. The training shall also include, but is not limited to:

a) The use, maintenance, and limitations of applicable personal monitors (LEL, O_2, H_2S and CO), as per the manufacturers operating manual.
b) Proper use of PPE and maintenance of that equipment. Remember that PPE is your last line of defense.
c) The requirement to maintain and inspect equipment as determined by manufacturer’s guidelines and site specific operating practices.
d) Recognizing and reporting of hazards. It is everyone’s responsibility to promptly report any hazardous condition or activity. Additionally, all necessary steps must be taken to immediately address (e.g. isolate, ventilate, eliminate) the hazard to prevent injury.

11.5 Personal Protective Equipment (PPE)

Workers shall carry personal monitors at all times. Personal gas monitors must be capable of detecting LEL, O_2, H_2S and CO. Exceptions may be considered at drilling and well servicing operations in which fixed monitoring is in place with continuous detection and an alarm system capable of alerting the workers.

Workers must first take steps to return / reduce the atmosphere to a safe entry level, if possible. If not possible, SCBA or SABA shall be worn when personnel are required to enter an environment containing more than 10% LEL, but less than 20% LEL, or whenever there is an oxygen deficient atmosphere or an H_2S atmosphere that exceeds provincial occupational exposure limits.

Note: Entry is prohibited if the area contains more than 20% LEL, due to the explosive hazard.

11.6 Signage and Product Labels

All facilities should have suitable signs posted at the entrance warning of the presence of flammable and toxic gases and/or liquids and the need for appropriate PPE as identified in this Guideline.

Warning signage such as: entrance signage “Light Hydrocarbon Gases may Cause Narcosis”, “flammable gas”, “danger H_2S”, PPE advice (“wear hearing protection”) is a method used to communicate hazards and assist you in protecting yourself.

Appendix “C” identifies the workplace label specifications necessary for light hydrocarbon products.

11.7 Building Entry Procedures

The Site Supervisor shall ensure personnel follow as a minimum, the guidelines in Appendix “D” – “Recommendations for Building Entry Procedures” or develop site specific Building Entry Procedures for all locations with the potential to contain flammable and/or toxic gases (Refer to the Building Entry Procedures Sour/ Sweet Form).

11.8 Glossary of Terms

CAPP LIGHT HYDROCARBON OH&S INFORMATION LETTER: An industry guide developed to address health hazards, exposure standards, detection, monitoring, etc., for handling of sweet light hydrocarbons.

CLASSIFIED AREA (as per the CSA C22.1 Safety Standard for Electrical installations, Canadian Electrical Code Part 1, Section 18-004). In this part, Classified area means Class I Division 2 as per the Canadian Electrical Code.

- Class I, Division 1 locations are those in which flammable gasses or vapours are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.
- Class I, Division 2 areas are those locations which flammable volatile liquids, flammable gases or vapours are handled, processed, or used, but in which they are normally confined within closed containers or systems from which they can escape only as a result of accidental rupture or abnormal operation of that equipment.

CODE: A body of laws of an organization, arranged systematically for easy reference. Any set of principles or rules of conduct.

GUIDELINE: A standard or principle by which to make a judgment or determine a policy or course of action.

LOWER EXPLOSIVE LIMIT (LEL): The lower limit of flammability of a gas in vapour at ordinary ambient temperature expressed in percent of the gas or vapour in air by volume. At concentrations lower than the LEL, the mixture is deemed to be too “LEAN” to burn.

NARCOSIS: A condition of unconsciousness normally caused by a narcotic, but in this case it is caused by low concentrations of Light Hydrocarbons.

UPPER EXPLOSIVE LIMIT (UEL): The highest concentration (expressed in percent of the gas or vapour in air by volume) of a substance that will burn or explode when an ignition source is present. At higher concentrations, the mixture is deemed to be too "RICH" to burn.

VEHICLE PARKING DISTANCE: The **minimum** safe distance that a vehicle can park without checking for a gaseous environment. Regulations established by Alberta Energy Utilities Board, Saskatchewan Energy/Mines and British Columbia Energy Mines/Petroleum Resources and Electrical Code.

WARNING SIGNAGE: A method used to communicate hazards and assist you in protecting yourself. For example, entrance signage "Light Hydrocarbon Gases may Cause Narcosis", "flammable gas", "danger H_2S", PPE advice ("wear hearing protection").

11.9 References

CAPP – OCCUPATIONAL HEALTH & SAFETY OF LIGHT HYDROCARBONS information letter

11.10 Applicable Regulations

	ALBERTA	SASKATCHEWAN	B.C.
EMPLOYER AND WORKER RESPONSIBILITIES ACCOUNTABILITY (e.g. addressing hazards)	OH&S ACT REG. #2 GENERAL SAFETY REG. #2, #15, #16	OH&S ACT REG. #3, #4, #6 OH&S GENERAL REG. #18, #127	H&S GENERAL REG. #8.10, #8.12, #8.18, #8.20
PPE COMPLIANCE	GENERAL SAFETY REG. #82 TO #92	OH&S GENERAL REG. #182 TO #198	H&S GENERAL REG. #8.14, #14.02 TO #14.21
VENTILATION SYSTEMS (e.g. for product exposure)	OH&S ACT VENT. REG. #3, #4 OH&S ACT CHEMICAL HAZARD REGULATIONS (ENTIRE)	OH&S GENERAL REG. #47 TO #51	H&S GENERAL REG. #13.37 TO #13.59
MANUFACTURER'S SPECIFICATIONS FOR EQUIPMENT	GENERAL SAFETY REG. #5, #6, #16	OH&S GENERAL REG. #10	H&S GENERAL REG. #8.02 TO #8.06
VEHICLE (MOTOR EXHAUST) ON LEASE	6 METRES ENERGY UTILITIES BOARD REG. #8.090(9)	6 METRES ENERGY AND MINES REG. #53 (5)(b)	5 METRES PETROLEUM AND NATURAL GAS ACT REG. #72(6)
CLASSIFICATION OF OIL AND GAS DRILLING/SERVICING OPERATIONS	OIL & GAS FIELD ELECTRICAL REQUIREMENTS REG #10		
CLASSIFICATION OF OIL AND GAS WELLS	OIL & GAS FIELD ELECTRICAL REQUIREMENTS REG #11		
CLASSIFICATION OF OIL AND GAS PROCESSING, TRANSMISSION AND STORAGE FACILITIES	OIL & GAS FIELD ELECTRICAL REQUIREMENTS REG #12		
CLASSIFICATION OF WATER FLOOD AND DISPOSAL SYSTEMS	OIL & GAS FIELD ELECTRICAL REQUIREMENTS REG #13		

Appendix A Potential Explosive Environments and Ignition Sources

1. EXPLOSIVE ATMOSPHERES

An atmosphere / environment that may become a hazardous or explosive environment because of the following conditions (other possibilities may exist):

a) Regulators venting inside buildings
b) Use of a hydrocarbon gas for instrumentation
c) Orifice plate vents inside buildings
d) Valve stem packing leaks (valves, controllers)
e) Threaded fittings leak
f) Faulty flame arrestor
g) Gasket / O ring failure (piping and equipment)
h) Over pressuring lines and equipment (process upset, shut downs not working)
i) Pressure Relief Device - discharging in an inappropriate place,
j) Piping leaks (no PRD, hydrate formation, corrosion)
k) Chemical vapours
l) Storage tank venting
m) Pump & Compressor seal / packing leaks
n) Valve failure (with no bull plug or cap in place)
o) Flare pit reclamation or cleaning up spill sites

2. IGNITION SOURCES

The following list is typical of ignition sources that may exist and must be considered:

a) Fired heaters, burners, pilots
b) Gas engine drivers (pump jacks)
c) Faulty flame arrestors
d) Iron sulphide deposits
e) Deficiencies within electrical components
f) Arcing / sparking of electrical equipment components (explosion-proof containment)

The following, lists examples of ignition sources that workers may bring into the workplace and should be addressed (other possibilities may exist):

a) Smoking
b) Welding / cutting
c) Burning rag (pilot, burner ignition)
d) Grinding / chipping / drilling
e) Friction (strike anywhere matches, lighters without enclosed mechanism)

f) Non-intrinsically safe items (2-way radio, cell phones, pagers, flashlight, cameras)
g) Hammer wrenches and steel hammers
h) Vehicle (internal combustion engine) and portable gas motors,
i) Flares (gun, fluid sounding)
j) Cathodic protection (not disconnected properly)
k) Purging practices (startup, shutdown)
l) Non-explosion proof electrical connections, equipment
m) No electrical zero-energy lock out
n) Catadyne heater start-up (cable must be at least 25 feet long)
o) Grounding cables not connected
p) Blowing down / draining fluids to non-conductive plastic pails or non-bonded containers
q) Electrostatic discharge from clothing (maybe FRC) and human body

Appendix B Explosive / Flammability Ranges

1. Different hydrocarbon products have different explosive or flammability ranges.
2. An explosive range of a hydrocarbon product is the percentage of flammable vapours mixed with air (based on normal ambient atmosphere of 20.9% oxygen and at ordinary ambient temperature) that is capable of igniting.
3. The Lower Explosive Limit (LEL) or the Lower Flammability Limit (LFL) is the lowest concentration of a combustible gas in air, which will result in an explosion if, ignited. For example, methane has a LEL of 5.3%. Therefore, a mixture of 5.3% methane in air will explode. A LEL meter calibrated for methane will show 100% on the scale when the concentration in air is 5.3% methane; 50% when the concentration is 2.6%, etc.
4. The Upper Explosive Limit (UEL) or Upper Flammability Limit (UFL) is the highest concentration of a gas or vapour that will produce an explosion and/or flash fire when an ignition source is introduced.
5. The following table identifies different explosive / flammability ranges of hydrocarbon products that may be present at work units. Methane (C1) is the primary component of natural gas. Ethane (C2) is included in the natural gas composition. Propane (C3) and Butane (C4) are usually LPG mixed streams. Pentanes (C5) or Hydrocarbon Condensate is composed of Butanes, Pentanes, Hexanes, Heptanes, Octanes and Nonane plus. Notice the extreme wide explosive ranges of Hydrogen Sulphide, Acetylene and Hydrogen.

PRODUCT	LEL (in %)	UEL (in %)
Methane	5.0	15.0
Ethane	2.9	13.0
Propane	2.1	9.5
Butane	1.8	8.4
Pentane	1.4	8.3
Hydrogen Sulphide	4.3	45.5
Acetylene	2.5	80.0
Hydrogen	4.0	74.2

Appendix C WHMIS Workplace Label Specifications

(From CAPP guideline information letter)

PRODUCT	WHMIS CLASSIFICATION	PPE SYMBOLS
Natural Gas	Class A: Compressed Gas Class B, Div. 1: Flammable Gas	SCBA/SABA*
Natural Gas Liquefied	Class A: Compressed Gas Class B, Div. 1: Flammable Gas	SCBA/SABA* Gloves Apron or skin protection Face shield
Liquefied Ethane, Butane & Propane	Class A: Compressed Gas Class B, Div. 1: Flammable Gas	SCBA/SABA* Gloves Apron or skin protection Face shield
LPG	Class A: Compressed Gas Class B, Div. 1: Flammable Gas	SCBA/SABA* Gloves Apron or skin protection Face shield

* SCBA/SABA: Self Contained Breathing Apparatus / Supplied Air Breathing Apparatus required if insufficient ventilation to maintain a safe atmosphere as outlined in this Guideline.

Appendix D Recommendations for Building Entry Procedures

1. When approaching a facility or a building, adhere to the warning signage and to the Company Respiratory and H_2S Codes of Practice. (For example - for H_2S facilities, you are carrying an activated personal H_2S monitor, and you would ensure that you use your radio / phone to check in with a base station, control room or someone who is aware of your activities and will monitor you. For sweet gas facilities, you are carrying an activated personal LEL monitor, and if possible, use your radio / phone to check in with a base station, control room or someone who is aware of your activities and will monitor you).
2. Observe the facility, building and area for any signs of abnormal conditions (e.g. lights flashing - activated by stationary LEL or H2S monitors, burner out, excess flaring, etc.).
3. The electrical code requires that vehicles not be parked within the classified area of a facility (well or building) without first conducting a gas check. If possible, park your vehicle facing off lease and upwind, towards the lease entrance.
4. Dissipate any potential static charge from your body either by touching a metal building or ground rod. If the building is not a metal building (i.e. fiberglass) then a grounding rod should be installed and used to dissipate the static charge.
5. Conduct an observation for anything abnormal (what you hear, see or smell). Check with the appropriate monitor. If the building does not have fixed / continuous monitoring, check the building internal atmosphere by inserting an LEL / H2S detector into a test port on the building wall / door or by opening the door slightly and placing the detector inside while standing outside, away from the door.
6. Once you have checked the inside atmosphere, proceed inside if safe and make a thorough visual inspection for any signs of abnormal conditions. If unsafe and you notice any abnormal or hazardous conditions, isolate the condition if possible and notify your supervisor or backup (person monitoring you) immediately.
7. Ensure adequate ventilation is maintained while you are in the building. Ensure building ventilation louvers are open and not blocked / door open.
8. Ensure you are carrying your personal monitor at all times.
9. Check out when finished at the facility / lease

OFFICE-HAZARD & CONTROLS

12.0 OFFICE-HAZARD & CONTROLS

12.1 Introduction

All Harvest Operations Corp (Harvest) office employees (Calgary and field) are required to follow safe work practices. The purpose of the Office Safety Program is to eliminate or reduce the number of injuries or incident occurring in the office environment.

12.2 Policy

This document applies to common office hazards and provides basic controls and procedures to work safely in proximity to these hazards. Harvest has in place external service providers that are available to evaluate the following office hazards:

- Ergonomic Assessments (work stations)
- Air Quality
- Office illumination

To access these services please notify the EH&S Department (EH&S@harvestenergy.ca)

12.3 Definitions

Hazard - Any situation, condition or thing that may be dangerous to safety or health of workers, or may cause damage or loss.

Risk Assessment – A process used to identify, quantify and rank risks

Risk Controls – Measures that reduce or control risks that have been identified through the risk assessment

Risk - is the potential of loss (an undesirable outcome, however not necessarily so) resulting from a given action, activity and/or inaction, foreseen or unforeseen. The notion implies that a choice having an influence on the outcome sometimes exists (or existed). Potential losses themselves may also be called "risks" without any indication of cause. Any human endeavour carries some risk, but some are much riskier than others.

12.4 Office Hazards

12.4.1 Office Illness and Injury

Today's offices present a range of health and safety concerns. In addition to obvious hazards such as slippery floors or an open file drawer, a modern office may also contain hazards such as poor lighting, noise, poorly designed furniture, equipment and machines that emit gases and vapors. The nature of office work itself has produced a whole host of stress-related symptoms and musculoskeletal strains. For example, long

hours at a poorly designed computer workstation can cause pains in the neck and back, shoulders, lower extremities, arms, wrists, hands, eyestrain, and a general feeling of tension and irritability. The leading types of disabling accidents that occur within the office are the result of falls, strains and overexertion, falling objects, striking against objects, and being caught in or between objects.

Office staff must:

- Know what to do in the case of an emergency
- Be provided with a safe and efficient workstation
- Be provided with periodic safety training that is appropriate to their job responsibilities and duties

12.4.2 Physical Office Hazards

Includes:

- Slips, trips, and falls
- Burn, cuts, and pinches
- Improper lifting and material handling techniques
- Adverse effects of noise, heat/cold, illumination/light, and poor ventilation
- Improper furniture or equipment layout and arrangement
- Overloaded electrical outlets and improper use or layout of extension cords
- Improper material storage
- Vehicle incident and journey management
- Ergonomics, fatigue, and improper use of prescription drugs
- Unobservant/inattentive employees and horseplay
- Working alone
- Personal or psychological factors associated with personal interactions, job control, and job performance.

12.4.3 Chemical Office Hazards

Includes:

- Indoor air pollutants affecting air quality
- Asbestos, ceramic fibre dust, toxic gases or vapours entering the office HVAC system
- Improper use and storage of cleaning agents, glues, correction fluids, inks, and toner cartridges.

Note: Refer to the WHMIS Safe Operating Procedure in section 3 of the Harvest Operations Corp. EHSMS for further guidance.

12.4.4 Biological Office Hazards

Includes:

- Exposure to hepatitis, influenza, E.coli, salmonella, HIV, and bird flu
- Allergies caused by pollen, dust mites, or cat/dog hair on clothing, perfumes
- Poor personal hygiene
- Unsanitary washroom or kitchen facilities and drinking water fountains
- Presence of mould or mildew
- Accidental exposure to blood or body fluids
- Presence of vermin or rodents, such as mice

Note: Refer to the Blood Borne Pathogens Code of Practice and Biological Hazards Safe Operating Procedure in section 3 of the Harvest Operations Corp. EHSMS for further guidance.

12.5 Common Office Incidents and Controls

12.5.1 Slips, Trips and Falls

Falls are the most common office accident, accounting for the greatest number of disabling injuries. Some of the common causes include; tripping over an open desk or file drawer, bending while seated in an unstable chair, tripping over electrical cords or wires, loose carpeting, objects stored in halls or walkways, inadequate lighting and by slipping on wet floors or icy surfaces. Office falls are frequently caused by using a chair or stack of boxes in place of a ladder. All of these fall hazards are preventable; the following list can help stop a fall before it happens.

- Be sure the pathway ahead is clear
- Close drawers completely after every use
- Avoid excessive bending, twisting, and leaning backward while seated
- Secure electrical cords and wires away from walkways
- Always use a stepladder for overhead reaching. Chairs should never be used as ladders
- Clean up spills immediately
- Always maintain good housekeeping practices
- Report loose carpeting or damaged flooring to your Supervisor
- Never carry anything that obscures your vision
- Avoid ‘distracted walking’ (e.g. texting)

If you find yourself heading for a fall, remember - roll, don't reach. By letting your body crumple and roll, you are more likely to absorb the impact and momentum of a fall without injury. Reaching an arm or leg out to break your fall may result in further injury.

12.5.2 Strains and Overexertion

Although a typical office job may not involve lifting large or especially heavy objects, it's important to follow the principals of safe lifting. Small, light loads (e.g. stacks of files, boxes of computer paper, books) can cause injury to your back, neck, and shoulders if you use your body incorrectly when you lift them. Backs are especially vulnerable; many back injuries result from improper lifting. Before you pick up a load ask yourself these questions:

- Is it too heavy for me to lift and carry alone?
- How high do I have to lift it?
- How far do I have to carry it?
- Am I trying to impress anyone by lifting this?

If you feel that the lift is beyond your ability, contact your supervisor or ask another employee to assist you.

12.5.2.1 Safe Lifting Techniques

- Look and plan ahead. Make sure your path is free of obstructions
- Take a balanced stance; feet placed shoulder-width apart. When lifting something from the floor, squat close to the load.
- Keep your back in its neutral or straight position. Tuck in your chin so your head and neck continue the straight back line.
- Grip the object firmly; draw the object close to you, holding your elbows close to your body to keep the load and your body weight centered.
- Lift by straightening your legs. Let your leg muscles, not your back muscles, do the work. Tighten your stomach muscles to help support your back. Maintain your neutral back position as you lift.
- Never twist when lifting. When you must turn with a load, turn your whole body, feet first.
- Never carry a load that blocks your vision.
- To set something down, use the same body mechanics designed for lifting.
- Never lift from a seated position.
- Store materials at knee level whenever possible instead of on the floor. Make shelves shallower (12-18") so one does not have to reach forward to lift the object. Break up loads so each weighs less.

12.5.3 Struck By or Striking Objects

Striking against objects is another cause of office injuries. Incidents of this type include:

- Bumping into doors, desks, file cabinets, and open drawers.
- Bumping into other people while walking.
- Striking against sharp objects such as office machines, spindle files, staples, and pins.
- Pay attention to where you are walking at all times

Objects striking employees can occur as a result of:

- Office supplies sliding from shelves or cabinet tops.
- Unbalanced file cabinets in which two or more drawers were opened at the same time or in which the file drawer was pulled out too far
- Machines and/or equipment that were dropped on feet
- Doors that were opened suddenly from the other side

Note: Proper material storage and use of storage devices can avoid these accidents.

12.5.4 Caught In or Between Objects

The last category of leading disabling incidents occurs as a result of office workers who get their fingers or articles of clothing caught in or between objects. Office workers may be injured as a result of:

- Fingers caught in a drawer, door, or window
- Fingers, hair or articles of clothing and jewelry caught in office equipment
- Fingers caught under the knife-edge of a paper cutter

Note: Building elevators also pose a hazard of being struck by or caught between the doors when entering or exiting.

12.6 Common Office Hazards and Controls

12.6.1 Material Storage

Office materials that are improperly stored can lead to objects falling on workers, poor visibility, and create a fire hazard. A good housekeeping program will reduce or eliminate hazards associated with improper storage of materials. Examples of improper storage include- unstable stacking, stacking materials too high, and obstructing doors/aisles/fire exits/fire-fighting equipment. The following are good storage practices:

- Boxes and cartons should all be of uniform size in any stack. Always stack material in such a way that it will not fall over.
- Do not overload top shelves or drawers. Store heavy objects on lower shelves.
- Tall storage shelves may be required to be anchored to the wall.
- Try to store materials inside cabinets, files, and lockers.
- Open drawers one at a time and close them after use to avoid overbalancing the cabinet. Use the handles for closing the drawers to prevent fingers from being pinched. Do not struggle with firmly stuck drawers to avoid hurting your back or having the drawer pull loose.
- Office equipment should be centered in the middle of a desk, filing cabinet, or table.
- Aisles, corners, and passageways must remain unobstructed.
- Storage areas should be designated and used only for that purpose. Store heavy materials so you do not have to reach across something to retrieve them.
- Fire equipment, extinguishers, fire door exits, and sprinkler heads should remain unobstructed. Materials should be at least 18 inches minimum away from sprinkler heads.

12.6.2 Workstation Ergonomics

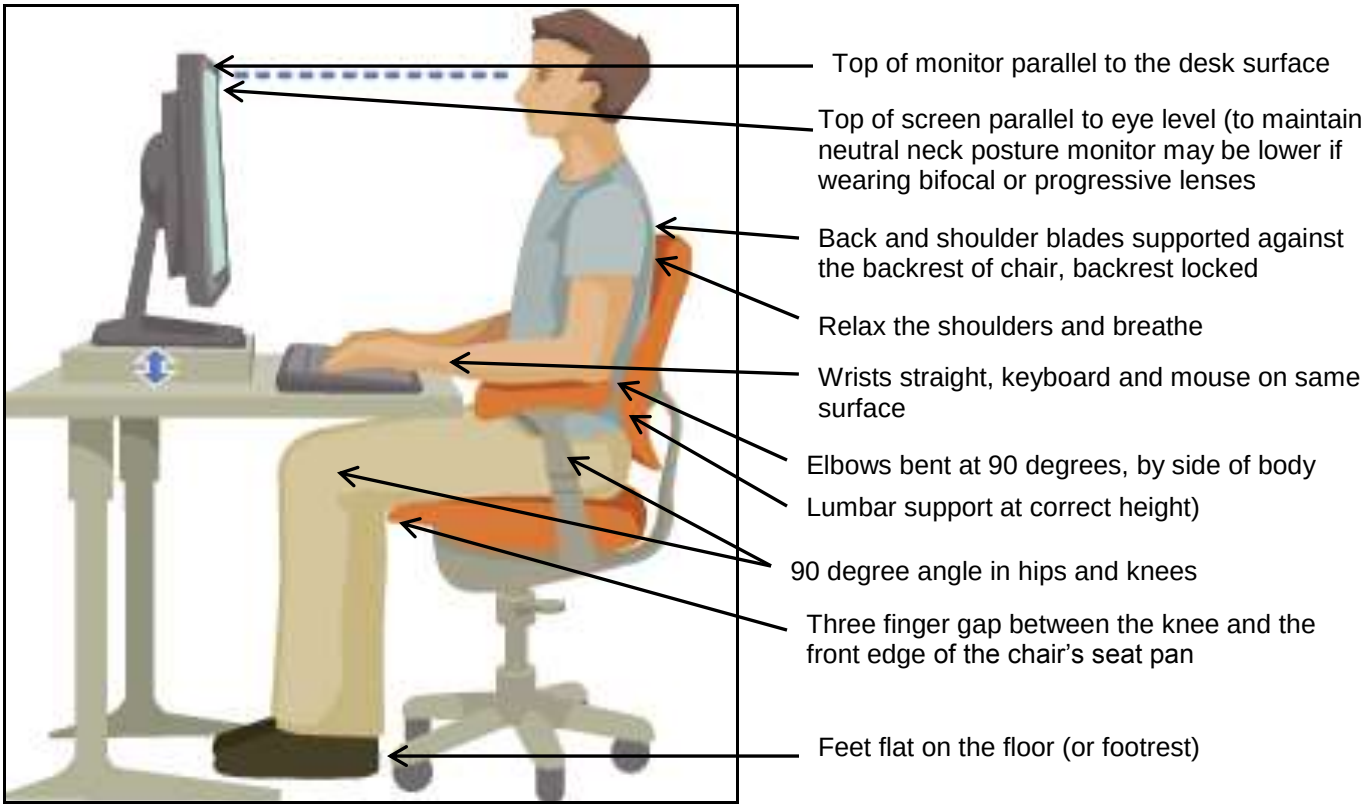
Ergonomics means fitting the workplace to the workers by modifying or redesigning the job, workstation, tool or environment. There are a multitude of discomforts and injuries which can result from ergonomically incorrect workstation setups. Common complaints relate to the neck, shoulders, back, arms, hands and the eyes (e.g., poorly designed office equipment, bad postures, etc. can cause lower back strain)

Certain common characteristics have been identified and associated with increased risk of musculoskeletal problems. These include:

- Design of the workstation
- Nature of the task
- Repetition of the task
- Cramped work space
- Work/rest schedules
- Physical characteristics of individual workers

The key to comfort is in maintaining the body in a relaxed, neutral position. If a keyboard is used, arms should be bent at right angles at the elbow, with the hands held in a straight line with forearms and elbows close to the body. The head should be in line with the body and slightly forward.

12.6.2.1 Arranging Your Workstation to Fit You



To arrange for an ergonomic assessment to assist you in properly setting up your work station, please contact the EH&S team (EH&S@harvestenergy.ca).

12.6.2.2 Applying Good Work Practices

- Adjusting the drapes or blinds
- Moving the monitor away from sources of glare or direct light
- Tipping the monitor slightly downward
- Using diffusers on overhead lighting
- Placing an anti-glare filter on the screen
- Clean the monitor screen on a regular basis
- Avoid cradling the telephone between the head and shoulder. Hold the phone with your hand, use the speaker phone, or a headset
- Keep frequently used items like the telephone, reference materials, and pens/pencils within easy reach
- Position the monitor directly in front of the user
- Move between different postures regularly
- Apply task lighting as to your needs
- Vary your tasks to avoid a long period of one activity
- Take mini-breaks to rest the eyes and muscles
- Neutralize distracting noise by using ear plugs, playing soft music, or turning on a fan
- Maintain a comfortable workplace temperature by using layers of clothing or a fan

12.6.3 Indoor Air Quality and Ventilation

The complexity of studying and measuring the quality of office environments arises from various factors including:

- Office building floor plans are frequently changing to accommodate increasingly more employees and reorganization.
- Office buildings frequently undergo renovations such as installation new carpet, modular office partitions, free-standing offices, and painting.
- Many of the health symptoms appearing are vague but are common to both the office and home environment.
- Guidelines or standards for permissible personal exposure limits to pollutants within office buildings are very limited.

Many times odors are associated with chemical contaminants from inside or outside the office space, or from the building fabric. This is particularly noticeable following building renovation or installation of new carpeting. Out-gassing from such things as paints, adhesives, sealants, office furniture, carpeting, and vinyl wall coverings is the source of a variety of irritant compounds. In most cases, these chemical contaminants can be measured at levels above ambient (normal background) but far below any existing occupational evaluation criteria.

Specialists have conducted hundreds of building studies which indicate that the most likely sources of this problem are - poor ventilation, poor thermal conditions, too high or low humidity, emissions from office machines, copiers and other building contaminants and poor ergonomic layout of workstations.

12.6.3.1 Environmental Parameters

A ventilation system should provide for a comfortable environment with respect to humidity and temperature.

Excessively high or low temperatures in an office area can also lead to symptoms in building occupants and reduce productivity. High temperatures have been associated with fatigue, lassitude, irritability, headache and decrease in performance, coordination and alertness.

For climate control in individual offices, please contact corporate services.

12.6.3.2 Indoor Air Pollution

An inadequately ventilated office environment or a poorly designed ventilation system can lead to the build-up of a variety of indoor air pollutants. Air pollutants can originate within the building or be drawn in from outdoors.

If you are having respiratory problems or experiencing allergic reactions or unusual smells, you should immediately report the problem to your supervisor and Harvest Corporate Services.

12.6.3.3 Controls to Prevent Indoor Air Pollution

- Office machinery should be operated in well-ventilated areas. Most office machinery does not require local exhaust ventilation in areas that are already provided with 7-10 air changes per hour. Photocopiers should be placed away from workers' desks. Workers should vary work tasks to avoid using machines excessively.
- Office equipment should be cleaned/maintained according to the manufacturer's recommendations.
- Special attention should be given to special operations that may generate air contaminants (such as painting, pesticide spraying, and heavy cleaning). Provisions for adequate ventilation must be made during these operations or other procedures, such as performing work off-hours or removing employees from the immediate area.

12.6.3.4 Evaluation

In order to determine if a possible relationship between any adverse health symptoms and indoor air quality exist, the Industrial Hygiene Section, OHS, can conduct an indoor air quality survey.

12.6.4 Lighting

Lighting is one of the hazards affecting personal comfort on the job. The best lighting system is one in which the light level is geared to the task, where brightness ratios are controlled (no intensely bright or dark areas in one field of vision) and where ceilings, walls and floor coverings are carefully chosen to minimize glare.

Different tasks require different levels of lighting. Work areas in which intricate work is performed greater illumination may be required. Lighting needs vary from time to time and person to person. One approach is to use adjustable task lighting that can provide needed illumination without increasing general lighting.

Poor office lighting can cause eye strain and irritation, fatigue, double vision, watering or reddening of the eyes, and a decrease in the power of focus and visual acuity. Headaches as well as neck and back pains may occur as a result of workers straining to see small or detailed items. Poor lighting in the workplace is also associated with an increase in incidents. Direct and reflected glare and shadows as well as delayed eye adaptation when moving from bright surroundings into dark ones (or vice versa) may prevent an employee from seeing tripping hazards and other similar hazards.

There are a number of measures that can be used to prevent and control poor lighting conditions in the work environment:

- Whenever possible, office workers should not face windows, unshielded lamps, or other sources of glare as this can cause unnecessary strain on the eyes.
- Adjustable shades should be used if workers face a window.
- Diffused light will help reduce shadows. Indirect lighting and task lighting are recommended, especially when work spaces are separated by dividers.

12.6.5 Noise

Noise can be defined very simply as unwanted sound. Office workers are subjected to many noise sources including video display terminals, high-speed printers, telephones, and human voices. Noise can produce tension and stress as well as damage to hearing at high noise levels. For noise levels in offices, the most common effects are interference with speech communication, annoyance, and distraction from mental activities. The annoying effect of noise can decrease performance or increase errors in some task situations.

Government standards have set limits for exposure to noise to prevent hearing loss in employees. The level of noise one can safely be exposed to is dependent on the intensity of the noise as well as the duration of exposure. In an office setting noise standards are rarely approached or exceeded.

If noise is a concern in your area contact Corporate Services.

12.7 Office Electrical Safety

Electrical equipment used in an office is potentially hazardous and can cause shock and burn injuries if improperly used or maintained.

Electrical incidents usually occur as a result of faulty or defective equipment, unsafe installation, or misuse of equipment. Ensure that all electrical cords and receptacles, including power bars, are in good condition and that they do not become overloaded.

12.7.1 Ungrounded Equipment

Most fixed equipment such as large, stationary machines must be grounded. Cord and plug connected equipment may need to be grounded, if operated at more than 150 volts to ground, or if it is of a certain type of equipment (e.g., refrigerators and air conditioners). Smaller office equipment would generally not fall into these categories and therefore may not have to be grounded.

12.7.2 Outlets

Overloading of electrical outlets should be avoided. Overloading electrical circuits and extension cords can result in a fire. Floor mounted outlets should be carefully placed to prevent tripping hazards.

12.7.3 Unsafe/Non-Approved Equipment

The use of poorly maintained or unsafe, poor quality, non-approved (by national testing laboratory) coffee makers, radios, lamps, etc. (often provided by or used by employees) should be discarded. Such appliances can develop a short circuit creating fire and/or shock hazards. Equipment and cords should be inspected regularly, and a qualified individual should make repairs.

Note: Portable heaters are not permitted

12.7.4 Defective, frayed or improperly installed cords for electrically-operated office equipment.

When the outer jacket of a cord is damaged it must be replaced. Electric cords should be examined on a routine basis for fraying and exposed wiring.

12.7.5 Improper Placement of Cords

A cord should not be pulled or dragged over nails, hooks, or other sharp objects that may cause cuts in the insulation. In addition, cords should never be placed on radiators, steam pipes, walls, and windows. Particular attention should be placed on connections behind furniture, since files and bookcases may be pushed tightly against electric outlets, severely bending the cord at the plug.

12.7.6 Electrical Cords across Walkways and Work Areas

An adequate number of outlet sockets should be provided. Extension cords should only be used in situations where fixed wiring is not feasible. However, if it is necessary to use an extension cord, never run it across walkways or aisles due to the potential tripping hazard. If you must run a cord across a walkway, either tape it down or purchase a cord runner.

12.7.7 Pulling of Plugs to Shut Off Power

Switches to turn on and off equipment should be provided, either in the equipment or in the cords, so that it is not necessary to pull the plugs to shut off the power. Never pull an electrical cord from the wall socket by yanking on the cord; pull the plug instead.

12.7.8 Working on Equipment

In accordance with manufacturers specifications it may be necessary to disconnect electrical machines before cleaning, adjusting, or applying flammable solutions. If a guard is removed to clean or repair parts, replace it before testing the equipment and returning the machine to service.

12.8 Office Fire Prevention Strategies

The best time to think about fire safety is before a fire starts. Learn the location of fire escape routes and how to activate the fire alarm. Participate in fire drills. Become familiar with stairway exits - elevators should not be used during a fire.

- Heat-producing equipment - copiers, work processors, coffee makers are often overlooked as a potential fire hazard. Keep them away from flammable materials.
- Electrical appliances can be fire hazards. Be sure to turn off all appliances at the end of the day.
- If electrical equipment malfunctions or gives off a strange odor, disconnect it and call Corporate Services. .
- Do not allow combustible material (boxes, paper, etc.) to be stored near sources of ignition.

Through a program of scheduled inspections, unsafe conditions can be recognized and corrected before they lead to injuries. Take a few moments each day to walk through your work area. Look for items previously pointed out, advise personnel in the area of the hazards and set about correcting them.

When used properly, portable fire extinguishers can put out small fires, control a fire until help arrives or allow workers to escape from a dangerous situation. Employees must be familiar with the location of fire extinguishers on their floor or within their building. Employees should be aware of how to use a portable fire extinguisher. For more detailed information refer to the Portable Fire Extinguishers SOP.

General guidance for fires and related emergencies includes:

- Get people out of immediate danger.
- Activate the building alarm (fire pull station). If not available or operational, verbally notify people in the building.
- Isolate the area by closing windows and doors and evacuate the building, if you can do so safely.
- If possible and if you have received appropriate training, use a portable fire extinguisher
- Do not collect personal or official items; leave the area of the fire immediately and walk, do not run to the exit and designated gathering area.
- You should provide the fire/police teams with the details of the problem upon their arrival. Special hazard information you might know is essential for the safety of the emergency responders. You should not re-enter the building until directed to do so. Follow any special procedures established for your floor.
- If the fire alarms are ringing in your building you must either; evacuate the building and stay out until notified to return or follow the directions of the voice command. Move to your designated meeting location or upwind from the building staying clear of streets, driveways, sidewalks, and other access ways to the building. If you are a supervisor, try to account for your employees, keep them together and report any missing persons to the emergency personnel at the scene.
- If an individual is overexposed to smoke or chemical vapors, remove the person to an uncontaminated area if safe to do so, and seek medical attention.

Each floor has designated fire wardens.

If your or another person's clothing catches fire, extinguish the burning clothing by using the stop-drop-roll technique, wrap victim in a fire blanket if available. Cover the injured person to prevent shock. Get medical attention promptly.

12.9 Emergency Preparedness

The office Emergency Response Plan will address potential emergencies that can be expected in your work area. For emergency evacuation, the use of floor plans or workplace maps that clearly show the emergency escape routes and safe or refuge areas should be included in the plan. All employees must understand what actions they are to take in the work area and assemble in a safe zone. All new employees should discuss how they should respond to emergencies with their supervisors shortly after starting work and whenever their responsibilities under the plan change. All field offices will use their site specific Emergency Response Plan including evacuation procedures.

This orientation should include:

- Identifying the individuals responsible for various aspects of the plan so that in an emergency, confusion will be minimized and employees will have no doubt about who has authority for making decisions.
- Identifying the method of communication that will be used to alert employees an evacuation or some other action is required as well as how employees can report emergencies (e.g. manual pull stations, public address systems, telephones)
- Identifying the evacuation routes from the building and locations where employees will gather

12.9.1 Alert or Evacuation Alarm is Activated

At the sound of a fire alarm:

- Follow the instructions of the fire wardens or alarm voice command
- If there are no fire wardens nearby and no instructions have been given by the alarm voice command, Security or Fire Department, evacuate out the nearest safe exit.
- Walk, do not run. Shut all doors behind you and proceed along corridors and in stairwells in a quiet, orderly manner.
- Proceed to Assembly Area as per the Fire Evacuation Plan map and/or as directed by Building Staff or Fire Department.

12.9.2 Medical Emergency

- Call 9-1-1 and provide the following information
  - Building address
  - Nearest cross streets
  - Location within the building (floor #, office #)
  - Nature of emergency and your call-back phone number
- Follow dispatcher's instruction and be prepared to provide additional information
- Remain on phone until dispatch hangs up

- Have someone else call Building Management/Security to report emergency and location
- Building Management/Security will expedite emergency personnel to your location

12.10 Safe Walk

Call Building Security and a security escort will walk you safely to your vehicle or transit stop

12.11 Incident Reporting

All incidents involving employee injury of any kind or near miss/hazard identifications will be reported and investigated according to Harvest Operations Incident Reporting & Investigation section in the EHSMS.

A written report must be initiated within 48 hours following all incidents using Harvest's electronic reporting system, Roughneck.

12.12 Roles and Responsibilities

Roles and responsibilities for Environment Health and Safety are described in the Harvest Operations Corp EHSMS Section 1;

- Roles and Responsibilities specific to this SOP are described below:

12.12.1 Supervisors

- Conduct regular inspections of their office operations to ensure compliance with safety standards, codes and regulations
- Ensure employees under their supervision are aware of their safety responsibilities at the office

12.12.2 Workers

Workers are responsible for reporting to their supervisor any equipment failures or environmental/ergonomic conditions adversely affecting their work, any incidents and/or unusual conditions which may occur during their work, and stopping work if necessary.

12.13 References

12.13.1 Internal References

1. EHSMS Section 1.0, Management Commitment & Responsibilities
2. EHSMS Section 2.0, Hazard Identification, Risk Assessment & Control
3. EHSMS Section 3.0, Policies, Codes of Practice, Rules, Procedures & Guidelines
4. EHSMS Section 6.0, Incident Reporting and Investigation
5. EHSMS Section 9.0, Emergency Response

12.13.2 External References

1. Alberta OHS Code (2009) – Part 2

OVERHEAD POWER LINES

13.0 OVERHEAD POWER LINES

13.1 Introduction

This practice is to ensure that personnel or equipment do not contact an overhead power line, or approach near enough to cause a flashover.

Note: Direct contact is not necessary for injury or fatality to occur.

From 1993 to 2003, 16 persons were killed in Alberta by overhead power line contacts.

Rules associated with power lines are contained in:

1. Alberta Electrical and Communication Utility Code (AECUC)
2. Alberta OH&S Code Part 17
3. Saskatchewan OH&S Regulations Section 465
4. British Columbia OH&S Regulations 19.24

AECUC considers two types of activities in proximity to overhead power lines:

1. **Working or operating equipment in the vicinity of an overhead power line.**
2. **Moving equipment or loads of a fixed height under overhead power lines.**

13.2 Working or Operating Equipment in the Vicinity of Overhead Power Line(s)

Where the boundaries of a work site are within 30m of any overhead power line, the Supervisor in charge of the job must:

a) Conduct a hazard assessment that includes as a minimum:

- Identifying the name of and contact person for the power line operator.
- Identifying the voltage and safe limit of approach distance of the power line in question.
- Identifying the height and maximum reach of any equipment to be used on the site.
- Ensuring that no part of that equipment or suspended load can come within 30m of an overhead power line unless:

The power line is de energized, or

A written procedure to conduct work safely is agreed upon by the Site Supervisor and the Next Level of Supervision (i.e. project manager, foreman superintendent)

b) Ensure that all workers are aware of the hazards associated with the job.

c) Ensure that procedures are in place to protect workers from hazards, and that all workers are familiar with the procedures.

d) Place highly visible warning signs 30m from and parallel to the power line on the work side of the power line (both sides if the power line transects the work site).

e) Place highly visible warning signs directly beneath the power line if it transects the work site or crosses an access road to the worksite.

f) Ensure that no person or equipment approaches within 7m (measured horizontally along the ground) of an overhead power line unless:

- The power line operator has been contacted for assistance, and:
- The Hazard Assessment provides a procedure for safe approach, or
- The power line is de-energized.

Table 1: Safe Limits of Approach Distances from Overhead Power Lines for Personnel & Equipment

Operating **voltage of overhead power line** between phase conductors	**Safe limit** of approach distances for persons and equipment
0 – 750 V (insulated or polyethylene covered conductors)	0.3m (300mm)
0 – 750 V (bare, un-insulated)	1.0m
Above 750 V insulated conductors	1.0m
0.75 kV – 40 kV	3.0m
69 kV - 72 kV	3.5m
138 kV - 144 kV	4.0m
230 kV - 260 kV	5.0m
500 kV	7.0m

Note: The table above is not all inclusive and you must ensure that you verify exact distances for the province you are working in.

13.3 Moving Equipment or Loads of a Fixed Height under Overhead Power Lines

Fixed height equipment does not include dump trucks that may be moving with an elevated box in the vicinity of overhead power lines. It does not include backhoes, cranes or other mobile heavy equipment while engaged in any “work”.

Table 2: Regulated Minimum Height of Overhead Power Lines for Personnel & Equipment

Location of overhead power line	Height above ground
areas normally accessible to pedestrians only	3.6 meters
driveways to residences or residential garages	4.1 meters
areas where agricultural equipment is normally used	4.2 meters
lanes, alleys or entrances to commercial or industrial properties	4.8 meters
roads and highways, and	5.3 meters
rights-of-way of underground pipelines.	5.4 meters

Alberta OH&S regulations allow for maximum load height of 4.15m. If equipment or loads higher than 4.15m are to be moved, the Supervisor in charge of the job must:

a) Contact the power line operator for assistance:

- Only the operator of a power line or his designate may make field measurements that involve contacting or approaching power lines.
- Under no conditions will anyone conduct work within the safe limits of approach, without the assistance of the operator of the overhead power line.

b) Conduct a Hazard Assessment jointly with the power line operator before proceeding with work.

c) Ensure that all workers are aware of the hazards associated with the job.

d) Ensure that procedures are in place to protect workers from hazards, and that all workers are familiar with the procedures.

Upon request, the operator of the power line or his designate must check the point of crossing to determine if there is sufficient clearance to proceed safely. The operator of the power line is required by regulation to provide assistance in accordance with the requirements of the safety rules contained in the Electrical and Communication Utility Code. If there is not sufficient clearance the power line operator will provide assistance to ensure the movement can be made safely. This may involve lifting the conductors, de-energizing the line, etc.

13.4 Overhead Power Line

Actions required to protect life and safety of workers in the event of contact:

a) Immediately stop the vehicle / equipment.
b) The operator of the vehicle must not get out of the vehicle until the power line is de-energized or until the vehicle / equipment are away from the hazard.
c) All workers are to move away from the hazard until the power line is de-energized.
d) In the event that the contact is made at an operating production site, facility operators should consider shutting down the production at that site until the hazard is controlled.
e) Once the immediate danger to life and health is controlled, call your supervisor immediately.

PORTABLE FIRE EXTINGUISHERS

14.0 PORTABLE FIRE EXTINGUISHERS

14.1 Introduction

When used properly, portable fire extinguishers can put out small fires or control a fire until help arrives or allows workers to escape from a dangerous situation. Workers must know how to use a portable fire extinguisher because there is no time to read directions during a fire emergency.

For a fire extinguisher to be effective, it must be:

a) The correct class (i.e., Class A, B, C, D) for extinguishing the fire you face, and
b) Within easy reach, in good working order, and fully charged.

This SOP describes portable fire extinguisher types, their selection, maintenance, and use.

14.2 Policy

The Portable Fire Extinguishers Safe Operating Procedures (SOP) applies to all Harvest Operations Corp. (Harvest) employees and contractors at Harvest facilities, worksites, or at locations where Harvest is the contract operator.

Where a Critical Task/Job Safety Analysis (JSA) has been written that follows the minimum components of, and meets the intent of the criteria in this practice, it shall take precedence over specific requirements herein.

14.3 Regulatory Requirements

This SOP is based primarily on Alberta's OHS Code and the NFPA Standard with requirements specific to British Columbia (BC) and Saskatchewan (SK) identified as a separate note in the appropriate section. The following is the primary fire-related health and safety legislation in Alberta, British Columbia, and Saskatchewan.

a) **Alberta Occupational Health and Safety Code (2009)** Part 10 Fire and Explosion Hazards, Part 37 Oil and Gas, and extracts from other relevant Parts
b) **British Columbia Occupational Health and Safety Regulations (to July 2009)** Part 4 General Conditions, Part 23 Oil and Gas, and extracts from other relevant Parts
c) **Saskatchewan Occupational Health and Safety Regulations (to 2007)** Part 25 Fire and Explosion Hazards, and extracts from other relevant Parts
d) **NFPA 10, Standard for Portable Fire Extinguishers (2007)**
e) **Work Safe Alberta, British Columbia and Saskatchewan**
f) Portable Fire Extinguisher Reference Publications

14.4 Responsibilities and Duties

14.4.1 Superintendents, Field Foremen, and Lead Operators

Superintendents, Field Foremen, and Lead Operators are responsible for:

a) Ensuring the Portable Fire Extinguishers SOP is implemented and followed at all facilities and worksite locations in their area of responsibility.
b) Selecting the approved contractors providing portable fire extinguisher inspection and maintenance services.
c) Selecting the portable fire extinguishers that are correct for the expected fire hazard at the worksite.
d) Performing routine safety checks, inspections, or audits are completed to ensure the procedures for portable fire extinguishers and/or that other control measures are being followed.

Note: The inspection or audit must confirm that fire extinguishers are correct for the travel distance between fire extinguishers and the type of fire hazards expected at the worksite.

e) Ensuring there is a system in place to distribute new regulatory requirements for portable fire extinguishers.

Note: Additional support and resources will be made available by the EH&S team.

14.4.2 Worksite Supervisor and/or Designated Alternates

The Worksite Supervisor is responsible for:

a) Ensuring the location of all portable fire extinguishers and their type is communicated to all workers. This includes the location of the SDS for the extinguishing agents.
b) Ensuring all portable fire extinguishers are identified, labelled, inspected, and maintained as outlined in this SOP or as per the manufacturer's instructions.

Note: This also includes inspecting work trailers and camp kitchens.

c) Ensuring all damaged or missing fire extinguishers are repaired, replaced, or maintained by an approved contractor.
d) Ensuring fire extinguishers are correct for the travel distance between fire extinguishers and the type of fire hazards expected at the worksite.
e) Completing an Incident Report whenever a fire extinguisher is used or a fire alarm is activated.
f) Ensuring workers are trained in the use of portable fire extinguishers.

14.4.3 Workers

All workers (includes contractors) are responsible for:

a) Knowing the location of portable fire extinguishers and SDS at the worksite.
b) Following this SOP and other site-specific requirements or instructions concerning fire extinguishers and fire prevention from their Worksite Supervisor.
c) Being trained in the handling, operation, maintenance, and storage of portable fire extinguishers.
d) Ensuring no equipment or materials block access to any firefighting equipment.
e) Reporting to the Worksite Supervisor when a portable fire extinguisher is used or a fire alarm is activated.
f) Reporting to the Worksite Supervisor any missing or damaged fire extinguishers, their signage, and any existing or potential fire hazards, incidents, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

14.5 Training

Harvest workers will be provided with on-the-job training in the most effective use of portable fire extinguishers and other firefighting equipment pursuant to their work activities. For further details, refer to the Harvest's Training Requirements as per Job Function, in the EHSMS. This training may also be provided through courses by recognized instructors. The training will be followed by refresher training and may include but is not limited to the following:

a) Understanding the source, causes, and classification of fires.
b) Discussion of the proper fire prevention techniques.
c) Participating in fire drills and fire extinguisher training exercises.
d) Location of fire alarms and extinguishers, and fire extinguishing techniques.
e) Proper methods and procedures for reporting emergencies.
f) Harvest's Emergency Response Plan (ERP) and evacuation procedures.

In British Columbia: Workers assigned to firefighting duties must be given adequate training, by a qualified instructor, in fire suppression methods, fire prevention, emergency procedures, organization and chain of command, firefighting crew safety, and communications applicable to their workplace. Additional requirements include:

a) Retraining for firefighting duties must be provided periodically but not less than once a year.
b) A worker assigned to firefighting duties must be physically capable of performing the assigned duties safely and effectively before being permitted to do them.

14.6 Hazards

Hazards associated with operating fire extinguishers include:

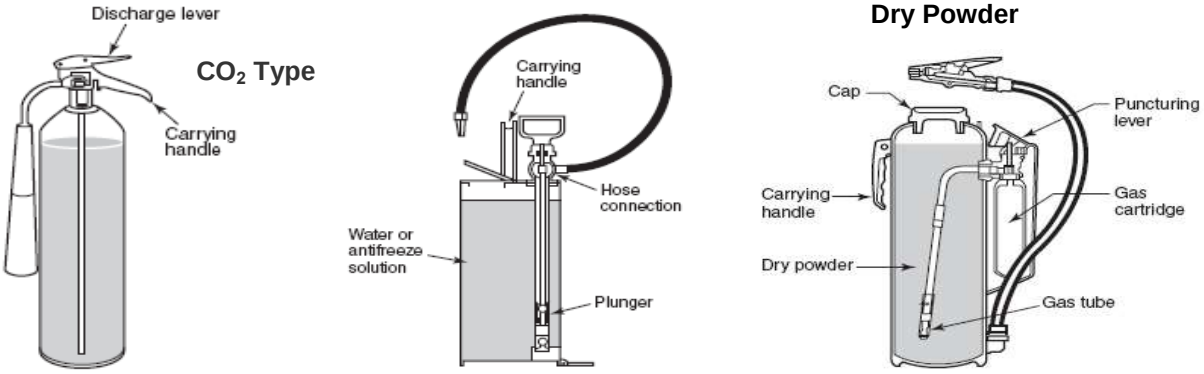
a) **Oxygen deficiency** when using a CO_2 fire extinguisher in a confined space
b) **Electrical shock** when using the wrong class/type of fire extinguisher
c) **Poor visibility** when using a dry chemical in a confined or poorly ventilated space
d) **Explosive reactions** when a dry chemical reacts with oxidizers containing chlorine
e) **Toxic gases** which are present in the smoke
f) **Radiant heat and oxygen depletion** caused by the fire
g) **Burns and/or skin irritation or equipment damage** due to exposure to radiant heat, flames, or the extinguishing agent

Note: These hazards must be considered when selecting a fire extinguisher.

14.7 Portable Fire Extinguisher Selection

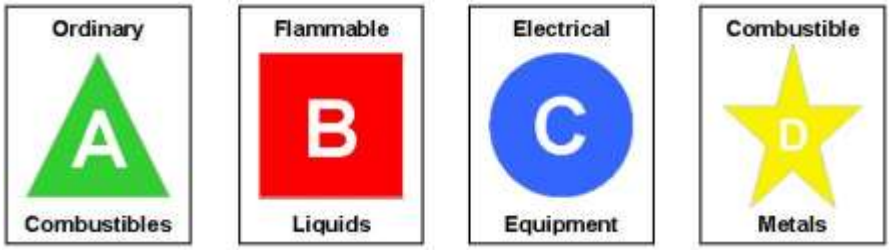
The selection of portable fire extinguishers will depend on several factors:

a) Size or type of fire hazard most likely to occur or encounter, see Classification of Fires.
b) Energized electrical equipment in the vicinity of a potential fire.
c) Ambient temperature conditions.
d) Weight, corrosive atmosphere, wind, extinguishing agent reaction, mobility of wheeled units, or number of trained staff available to fight the fire.



14.8 Classification of Fires and Fire Extinguisher Travel Distances

Each fire extinguisher is marked to indicate the class of fires on which it should be used.



The following travel distances listed below are recommended distances only. A risk assessment will aid in determining the appropriate distances.

1. **Class "A" Fire:** Fires of ordinary combustible materials such as wood paper and rubber. A water or a multi-purpose dry chemical fire extinguisher is often used to quench and soak burning materials.
   Travel Distance: Not more than 23m (75 ft) as per NFPA Section 6.2

2. **Class "B" Fire:** Fires of flammable liquids such as gasoline, oils, greases, and oil-based paints. Water will not extinguish this type of fire. The burning liquid will float on the water and spread the fire further.
   Travel Distance: 9m (30ft) to 15m (50ft) as per NFPA Section 6.3

   Note: The reason these travel distances are less than Class A fires is that Class B fires reach their maximum intensity almost immediately requiring the fire extinguisher to be brought to the fire in a much shorter period of time. See NFPA Section 6.3 for additional information.

3. **Class "C" Fire:** Fires in electrical equipment such as motors, generators, and switch panels, where the use of a non-conducting extinguishing agent is of importance. Never attempt to put out a Class C fire with water, unless the electrical connection has been disconnected.
   Travel Distance: Based on anticipated fire hazard, Class A or B as per NFPA Section 6.4

4. **Class "D" Fire:** Fires involving combustible metals such as magnesium, titanium, sodium, etc. Class D fires are unresponsive to conventional fire extinguishers. Special extinguishing agents must be used or the fire may be smothered with dry sand.
   Travel Distance: Not more than 23m (75ft) as per NFPA Section 6.5

5. **Class “K” Fire:** Kitchen fires that involve combustible vegetable or animal oils and fat.
   Travel Distance: Not more than 9m (30ft) as per NFPA Section 6.6

14.9 Placement of Fire Extinguishers

14.9.1 Oilfield-Related Work

a) **Service Vehicles:** All Harvest and contractor service vehicles must be equipped with at least a 30 BC-rated portable fire extinguisher. In the case of service vehicles at unmanned facilities, a risk assessment will determine the need for equipping service vehicles with a larger capacity fire extinguisher.

b) **Well Stimulation:** If flammable fluids are being pumped during fracturing and acidizing treatment, fire protection equipment capable of extinguishing a fire that may occur must be provided on pumping units, including blenders and coiled tubing units.

c) **All-Terrain Vehicles** must be equipped with a fire extinguisher.

d) **Crane Cabs** must be equipped with a fire extinguisher having at least a 10 BC rating.

e) **Chainsaw Operators** must have a fire extinguisher nearby ready for immediate use.

f) Fire extinguishers of suitable type and capacity must be placed not more than 9m away from:

- All hot work, confined space entries, and ground disturbance or any other work requiring a Hot Work Agreement,
- An industrial open-flame portable heating device that is in use, and
- A welding, burning or cutting operation that is in progress.

g) A fire extinguisher approved for Class C fires must be readily available to workers working on or near energized high-voltage electrical equipment.

h) Electrical and Motor Control Centre (MCC) buildings will be equipped with a CO2 portable fire extinguisher.

i) Harvest installs dry chemical fire extinguishers as the company standard for facilities and service vehicles. The chemical used is Purple K.

j) All fire extinguishers must meet the requirements of the latest edition of NFPA 10, Portable Fire Extinguishers.

k) Ensure all hand-held portable fire extinguishers are suitable for use in sub-zero weather (e.g., installation of low temperature nitrogen cartridges).

l) WHMIS labels must be affixed to the fire extinguisher and an SDS filed at the worksite.

m) See also Minimum Fire Extinguisher Requirements for British Columbia.

Note: An Incident Report must be completed whenever an extinguisher is used.

14.9.2 General Placement of Fire Extinguishers

Portable fire extinguishers should be located as close as possible to the likely fire hazards, but consideration must be given to accessibility during a fire. When locating a fire extinguisher, the following requirements must be met:

a) Strategically locate extinguishers along normal paths of travel at each facility and in assigned vehicles to ensure they are readily accessible and available.
b) Fire extinguishers must be placed in accordance with local fire regulations and the National Fire Protection Association (NFPA) 10 Standard. See Classification of Fires and Recommended Fire Extinguisher Travel Distances.
c) Clearly and properly mark all extinguishers to ensure proper selection at the time of fire.
d) Mount or set extinguishers so that identification and operating instructions face outward.
e) Mount all extinguishers (except wheeled-type) on brackets or place in cabinets.
f) In areas where extinguishers cannot be seen due to visual obstructions, mark their locations with painted symbols or signage, located high enough to be seen.
g) House wheeled-type extinguishers in buildings designed to ensure ease of removal by a truck or an individual.
h) If extinguishers are moved to provide protection for a specific task, return them to their location as soon as the task is completed. If an extinguisher is used, ensure a trained person depressures the extinguisher, refills it, and installs a new pressure cartridge.

Note: An Incident Report must be completed whenever an extinguisher is used.

14.10 Operating a Fire Extinguisher

Remember **PASS** – a common term (or acronym) or memory trigger for the following four steps for operating a fire extinguisher:

1. **Pull** the safety pin at the top of the extinguisher.
2. **Aim** the nozzle or hose at the base of the flames.
3. **Squeeze** or pump the handle.
4. **Sweep** from side to side at the base of the fire.

Portable fire extinguishers are not designed to fight large or spreading fires. Fire extinguishers are useful under certain conditions and extreme care should be taken when attempting to extinguish any fire when using a hand-held extinguisher.

14.11 Inspections of Portable Fire Extinguishers

A fire extinguisher inspection program must be in place to ensure extinguishers are maintained in a fully charged, operable condition and are located at their designated location. The inspection program must meet the following minimal requirements:

a) All portable extinguishers must be visually inspected at least once a month to ensure:

1. Fire extinguishers are in their designated locations; replace missing or damaged signage as required.
2. Safety seals and tamper indicators are not broken or missing.
3. There are no obstructions in the nozzle or hose.
4. They are examined for obvious physical damage, corrosion, or leakage.
5. The pressure gauge or indicator is in the operable range or position (record readings).
6. Access to the extinguisher is not obstructed and the nameplate faces outward.
7. Each extinguisher is examined and the condition of the tires, wheels, hose, and nozzle for wheeled units are recorded.
8. All inspection records will be retained at the facility where the fire extinguisher is located.
9. Each inspection date is recorded on the tag.

b) A durable-approved tag showing recharge maintenance and inspection dates and the name or initials of the person who serviced it may be affixed to each portable extinguisher. This information can also be recorded on the P.M. records.

c) All extinguishers must be examined by an approved agency on a yearly basis. This examination will include the inspection of mechanical parts, extinguishing materials, and expelling agents. The approved agency will supply the approved inspection tags.

d) When an inspection reveals any of the above as being deficient, then the extinguisher must be tagged, removed from service, and subjected to immediate corrective maintenance.

Note: Fire extinguishers removed from service must be replaced with spare units of the same classification and capacity.

14.12 Fire Extinguisher Maintenance

a) Fire extinguishers must be serviced annually by a qualified person; a record of this service must be kept. A durable tag showing recharge maintenance dates and the name or initials of the person who serviced it must be affixed to each extinguisher.

Note: See NFPA 10, Standard for Portable Fire Extinguishers (2007), for detailed information.

b) Fire extinguisher maintenance involving internal inspection must be as follows:

Extinguisher Type	Internal Examination Interval (years)
Stored-pressure loaded-stream and antifreeze	1
Pump tank water and pump tank calcium chloride based	1
Dry chemical, cartridge- and cylinder-operated, with mild steel shells	1*
Dry powder, cartridge- and cylinder-operated, with mild steel shells	1*
Wetting agent	1
Stored-pressure water	5
AFFF (aqueous film-forming foam)	†
FFFP (film-forming fluoroprotein foam)	†
Stored-pressure dry chemical, with stainless steel shells	5
Carbon dioxide	5
Wet chemical	5
Dry chemical stored-pressure, with mild steel shells, brazed brass shells, and aluminum shells	6
Halogenated agents	6
Dry powder, stored-pressure, with mild steel shells	6

*Dry chemical in cylinder-operated extinguishers is examined annually.

†The extinguishing agent in liquid charge-type AFFF and FFFP extinguishers is replaced every 3 years and an internal examination (teardown) is normally conducted at that time. The agent in solid charge-type AFFF extinguishers is replaced every 5 years during the periodic hydrostatic test and the teardown is done at that time.

c) An annual conductivity test must be performed on all CO_2 extinguisher hoses.

d) Every 6 years, a stored pressure, dry powder rechargeable extinguisher (extinguishing material and expellant gas are contained in a single cylinder) must have its contents emptied and be inspected.

e) All portable fire extinguishers must be hydrostatically tested as follows:

Extinguisher Type	Test Interval (years)
Stored-pressure water, water mist, loaded stream, and/or antifreeze	5
Wetting agent	5
AFFF (aqueous film-forming foam)	5
FFFP (film-forming fluoroprotein foam)	5
Dry chemical with stainless steel shells	5
Carbon dioxide	5
Wet chemical	5
Dry chemical, stored-pressure, with mild steel shells, brazed brass shells, or aluminum shells	12
Dry chemical, cartridge- or cylinder-operated, with mild steel shells	12
Halogenated agents	12
Dry powder, stored-pressure, cartridge- or cylinder-operated, with mild steel shells	12

Note: When Halon extinguishers require a hydrostatic testing or recharging, they will be taken out of service and replaced with an alternative extinguisher. Contact the EHS Advisor for extinguisher replacement requirements.

f) Wheeled fire extinguisher, nitrogen, argon, $C0_2$ or inert gas-pressure cartridges must have a hydrostatic test performed every 5 years.

Note: Fire extinguishers removed for maintenance should be replaced with spare units of the same classification, rating, and equal capacity. If this cannot be effectively completed, then all extinguishers must not be removed at once.

14.13 Recharging

a) All extinguishers shall be recharged (by trained personnel) after use, as indicated by an inspection, or when performing scheduled maintenance. The manufacturer's instructions must be followed.

b) No extinguisher shall be converted from one type to another type (i.e., replace or fill with a different type of extinguishing agent).

14.14 Removal from Service

Remove from service and destroy those fire extinguishers when the following occurs:

a) The repair has been previously conducted with soldering, welding, or brazing.
b) The cylinder or shell threads are damaged.
c) Corrosion exists that has caused pitting (check nameplates/assemblies).
d) The integrity of the cylinder is suspect (dents and chips).
e) The cylinder has been burned or scorched in a fire.

14.15 Minimum Fire Extinguisher Requirements

Table 23.10 (BC Oil and Gas OHS Regulations Part 23)

Work activity	Number of extinguishers required	Type of extinguisher
Heavy hauler	1	20-BC
Hot oiler	2	20-BC
Seismic shot hole drill	2	20-BC
Drilling rig	4	40-BC
Service rig	4	40-BC
Battery operator	1	20-BC
Fluid hauler	1	40-BC
Service truck of 1 tonne capacity or more	1	20-BC
Any other commercial vehicle	1	5-BC
Any vehicle carrying explosives	2	20-BC
Welder	1	10-BC
Well testing	2	10-BC
1 fracturing tank	1	Twin agent unit
2, 3 or 4 fracturing tanks	1	Continuous foam unit with 100 barrel water truck
5 or more fracturing tanks or greater than 40% methanol water fracturing	The fire hazard must be evaluated in accordance with current industry standards, and firefighting equipment and personnel must be provided as determined necessary by the evaluation.	

14.16 Characteristics of Fire Extinguishers

Extinguishing Agent	Method of Operation	Capacity	Horizontal Range of Stream	Approximate Time of Discharge	Protection Required below 40°F (4°C)	UL or ULC Classifications[a]
Water	Stored-pressure	6 L	30 to 40 ft	40 sec	Yes	1-A
	Stored-pressure or pump	2½ gal	30 to 40 ft	1 min	Yes	2-A
	Pump	4 gal	30 to 40 ft	2 min	Yes	3-A
	Pump	5 gal	30 to 40 ft	2 to 3 min	Yes	4-A
Water (wetting agent)	Stored-pressure	1½ gal	20 ft	30 sec	Yes	2-A
	Stored-pressure	25 gal (wheeled)	35 ft	1½ min	Yes	10-A
	Stored-pressure	45 gal (wheeled)	35 ft	2 min	Yes	30-A
	Stored-pressure	60 gal (wheeled)	35 ft	2½ min	Yes	40-A
Loaded stream	Stored-pressure	2½ gal	30 to 40 ft	1 min	No	2-A
	Stored-pressure	33 gal (wheeled)	50 ft	3 min	No	20-A
AFFF, FFFP	Stored-pressure	2½ gal	20 to 25 ft	50 sec	Yes	3-A:20 to 40-B
	Stored-pressure	6 L	20 to 25 ft	50 sec	Yes	2-A:10-B
	Nitrogen cylinder	33 gal	30 ft	1 min	Yes	20-A:160-B
Carbon dioxide[b]	Self-expelling	2½ to 5 lb	3 to 8 ft	8 to 30 sec	No	1 to 5-B:C
	Self-expelling	10 to 15 lb	3 to 8 ft	8 to 30 sec	No	2 to 10-B:C
	Self-expelling	20 lb	3 to 8 ft	10 to 30 sec	No	10-B:C
	Self-expelling	50 to 100 lb (wheeled)	3 to 10 ft	10 to 30 sec	No	10 to 20-B:C
Regular dry chemical (sodium bicarbonate)	Stored-pressure	1 to 2½ lb	5 to 8 ft	8 to 12 sec	No	2 to 10-B:C
	Cartridge or stored-pressure	2¾ to 5 lb	5 to 20 ft	8 to 25 sec	No	5 to 20-B:C
	Cartridge or stored-pressure	6 to 30 lb	5 to 20 ft	10 to 25 sec	No	10 to 160-B:C
	Stored-pressure	50 lb (wheeled)	20 ft	35 sec	No	160-B:C
	Nitrogen cylinder or stored-pressure	75 to 350 lb (wheeled)	15 to 45 ft	20 to 105 sec	No	40 to 320-B:C
Purple K dry chemical (potassium bicarbonate)	Cartridge or stored-pressure	2 to 5 lb	5 to 12 ft	8 to 10 sec	No	5 to 30-B:C
	Cartridge or stored-pressure	5½ to 10 lb	5 to 20 ft	8 to 20 sec	No	10 to 80-B:C
	Cartridge or stored-pressure	16 to 30 lb	10 to 20 ft	8 to 25 sec	No	40 to 120-B:C
	Cartridge or stored-pressure	48 to 50 lb (wheeled)	20 ft	30 to 35 sec	No	120 to 160-B:C
	Nitrogen cylinder or stored-pressure	125 to 315 lb (wheeled)	15 to 45 ft	30 to 80 sec	No	80 to 640-B:C
Super K dry chemical (potassium chloride)	Cartridge or stored-pressure	2 to 5 lb	5 to 8 ft	8 to 10 sec	No	5 to 10-B:C
	Cartridge or stored-pressure	5 to 9 lb	8 to 12 ft	10 to 15 sec	No	20 to 40-B:C
	Cartridge or stored-pressure	9½ to 20 lb	10 to 15 ft	15 to 20 sec	No	40 to 60-B:C
	Cartridge or stored-pressure	19½ to 30 lb	5 to 20 ft	10 to 25 sec	No	60 to 80-B:C
	Cartridge or stored-pressure	125 to 200 lb (wheeled)	15 to 45 ft	30 to 40 sec	No	160-B:C

Extinguishing Agent	Method of Operation	Capacity	Horizontal Range of Stream	Approximate Time of Discharge	Protection Required below 40°F (4°C)	UL or ULC Classifications[a]
Multipurpose/ABC dry chemical (ammonium phosphate)	Stored-pressure	1 to 5 lb	5 to 12 ft	8 to 10 sec	No	1 to 3-A[c] and 2 to 10-B:C
	Stored-pressure or cartridge	2½ to 9 lb	5 to 12 ft	8 to 15 sec	No	1 to 4-A and 10 to 40-B:C
	Stored-pressure or cartridge	9 to 17 lb	5 to 20 ft	10 to 25 sec	No	2 to 20-A and 10 to 80-B:C
	Stored-pressure or cartridge	17 to 30 lb	5 to 20 ft	10 to 25 sec	No	3 to 20-A and 30 to 120-B:C
	Stored-pressure or cartridge	45 to 50 lb (wheeled)	20 ft	25 to 35 sec	No	20 to 30-A and 80 to 160-B:C
	Nitrogen cylinder or stored-pressure	110 to 315 lb (wheeled)	15 to 45 ft	30 to 60 sec	No	20 to 40-A and 60 to 320-B:C
Dry chemical (foam-compatible)	Cartridge or stored-pressure	4¾ to 9 lb	5 to 20 ft	8 to 10 sec	No	10 to 20-B:C
	Cartridge or stored-pressure	9 to 27 lb	5 to 20 ft	10 to 25 sec	No	20 to 30-B:C
	Cartridge or stored-pressure	18 to 30 lb	5 to 20 ft	10 to 25 sec	No	40 to 60-B:C
	Nitrogen cylinder or stored-pressure	150 to 350 lb (wheeled)	15 to 45 ft	20 to 150 sec	No	80 to 240-B:C
Dry chemical (potassium bicarbonate urea based)	Stored-pressure	5 to 11 lb	11 to 22 ft	18 sec	No	40 to 80-B:C
	Stored-pressure	9 to 23 lb	15 to 30 ft	17 to 33 sec	No	60 to 160-B:C
		175 lb (wheeled)	70 ft	62 sec	No	480-B:C
Wet chemical	Stored-pressure	3 L	8 to 12 ft	30 sec	No	K
	Stored-pressure	6 L	8 to 12 ft	35 to 45 sec	No	K
	Stored-pressure	2½ gal	8 to 12 ft	75 to 85 sec	No	K
Halon 1211 (bromochloro-difluoromethane)	Stored-pressure	0.9 to 2 lb	6 to 10 ft	8 to 10 sec	No	1 to 2-B:C
	Stored-pressure	2 to 3 lb	6 to 10 ft	8 to 10 sec	No	5-B:C
	Stored-pressure	5½ to 9 lb	9 to 15 ft	8 to 15 sec	No	1-A:10-B:C
	Stored-pressure	13 to 22 lb	14 to 16 ft	10 to 18 sec	No	2 to 4-A and 20 to 80-B:C
	Stored-pressure	50 lb	35 ft	30 sec	No	10-A:120-B:C
	Stored-pressure	150 lb (wheeled)	20 to 35 ft	30 to 44 sec	No	30-A:160 to 240-B:C
Halon 1211/1301 (bromochloro-difluoromethane bromotrifluoro-methane) mixtures	Stored-pressure or self-expelling	0.9 to 5 lb	3 to 12 ft	8 to 10 sec	No	1 to 10-B:C
	Stored-pressure	9 to 20 lb	10 to 18 ft	10 to 22 sec	No	1-A:10-B:C to 4-A:80-B:C
Halocarbon type	Stored-pressure	1.4 to 150 lb	6 to 35 ft	9 to 23 sec	No	1-B:C to 10-A:80-B:C

Note: Halon should be used only where its unique properties are deemed necessary.

[a]UL and ULC ratings checked as of July 24, 1987. Readers concerned with subsequent ratings should review the pertinent lists and supplements issued by these laboratories: Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062, or Underwriters Laboratories of Canada, 7 Crouse Road, Scarborough, Ontario, Canada M1R 3A9.

[b]Carbon dioxide extinguishers with metal horns do not carry a C classification.

[c]Some small extinguishers containing ammonium phosphate–based dry chemical do not carry an A classification.

SAFETY EYEGLASSES

15.0 SAFETY EYEGLASSES

15.1 Objective

1. To provide eye protection to all persons while working on a Harvest Operations Corp. (HOC) site.
2. To provide all employees who work in the field with CSA approved prescription or non-prescription safety eyeglasses.
3. To establish guidelines for:

    a) The locations where safety eyeglasses shall be worn.
    b) The type of safety eyeglasses that can be purchased.
    c) The procedure for purchasing safety eyeglasses.
    d) Other pertinent issues.

15.2 Standard

1. Safety eyeglasses with side shields (fixed or detachable) shall be worn in all Harvest field locations with the exception of offices, control rooms, lunchrooms and highway vehicle cabs.
2. All personnel are required to comply with this practice. A supply of CSA approved standard (non-prescription) safety eyeglasses will be maintained at each site for loan to individuals not providing their own.
3. The wearing of contact lenses does not negate the requirement for wearing safety eyeglasses; however, the wearing of contact lenses in lieu of framed prescription glasses is discouraged.
4. The wearing of safety eyeglasses does not supersede the mandatory requirement to wear appropriate eye protection such as goggles or face shields for specific tasks performed.
5. All employees are expected to store glasses, when not in use, in carrying cases provided to prevent scratching or premature breakage.
6. Harvest will pay for safety eyeglasses as outlined below

    a) Frames meeting CSA standards.
    b) Plastic lenses meeting CSA standards (glass is not permitted).
    c) Side shields (fixed or detachable), as per CSA Standard Z94.3-02.

7. One pair of prescription clear safety eyeglasses and one pair of tinted safety eyeglasses, with a maximum tint of 30%, or up to 75% with supervisor and safety coordinator approval.

Notes:

- Ultraviolet & Scratch Resistant coatings will be applied as a standard.
- Single or multi-layer anti-reflective coating will be allowed for individuals with high index lenses (supervisor approval).

8. The company will pay directly, on behalf of the employee, the charges billed by the optometrist for such frames, lens and carrying case.
9. The employee is responsible for the cost of his/her own eye testing.
10. The company will pay for the initial pair of prescription safety eyeglasses and replacement every two years thereafter as required. At the discretion of the supervisor, the company will pay for replacement due to wear, breakage or significant prescription change.
11. Harvest will maintain a stock of standard (non-prescription) safety eyeglasses at each site for issue to employees who do not require special fitting. Where fitting is a problem, the employee shall purchase glasses as per the following prescription safety eyeglass purchasing procedure.

15.3 Purchasing Procedure

1. The employee will review the Safety Eyeglass Guideline and a current list of Participating Optometrists, then obtain the correct form and obtain coding information and Supervisor approval before attending an appointment with a participating optometrist of his/her choice.
2. The employee's supervisor verifies that employee is eligible, approves form and any necessary special material requirements, extra pair, etc., (contact the Environment, Health & Safety Program Coordinator for special circumstances or needs).
3. The optometrist will perform an optometric examination and record the findings in the appropriate sections of the form as outlined in their OVC/ OVP Practitioner Manuals.

Note: The employee may choose not to have an eye examination; or the employee may have a prescription from an Ophthalmologist, which may be presented to the optometrist for purchasing safety eyeglasses.

15.3.1 Alberta

1. Your supervisor must approve that you are eligible to participate in the prescription safety glasses program (OVC).

2. Request an Eyesafe Online job ticket from RedCliff.Admin@harvestenergy.ca and cc your supervisor. You will be required to provide the following information:

   - Department
   - Cost Centre/ AFE/ GNA
   - Invoice coding

3. Choose an OVC Optometrist from https://www.optometrists.ab.ca/WEB/AAO/Doctors/Find_An_Optometrist/AAO/Doctors/Find_An_Optometrist.aspx

4. Employee goes to an optometrist's office and presents the Eyesafe job ticket. That form will designate the specific client company name. The optometrist's office then accesses your customized company criteria to determine appropriate safety eyewear, including allowable treatments or any "employee pay" portions.

5. Employee will be required to complete a vision examination for which they will be charged. The examination may not be necessary if the employee has recently (within the last 2 years) received an examination from an optometrist or an ophthalmologist (proof of prescription must be shown).

6. Employee is fitted with a safety frame of his/her choice according to the program parameters. There is a quote process at this point; if the cost goes above the company contributions, you will be required to pay the balance.

7. Optometrist will log into the Eyesafe Online application and inputs the appropriate frames and lenses according to your company criteria.

8. When glasses are complete, the employee picks up their glasses, at which time any amounts due over and above the company's agreed upon must be paid.

15.3.2 Saskatchewan

Supervisor:

1. Review company policy and list of participating Optometrists
2. Complete authorization requirements and issue to employee providing full instructions

Employee:

3. Make an appointment with an SAO OVC optometrist (see approved list from supervisor) of your choice and provide office with supervisor signed authorization form.

Optometrist:

4. Consult company directive in the OVC manual or online for client company billing, examination and dispensing instructions
   - Complete and sign the form in accordance with the company directive (Email EHS@harvestenergy.ca to obtain a copy of this form).
5. Forward white copy or fax to approved Optical Laboratory as listed in current list of approved safety frames and laboratories.

Optical Laboratory:

6. Prepare safety glasses in accordance with directive specifications.
7. Once glasses are completed, sign and stamp to indicate CSA approval on the form.
8. Forward a copy to SAO for billing purposes.
9. Return a copy of order with glasses to optometric office.

Optometrist:

10. Verify lens prescription and frame specifications.
11. Notify employee for fitting and adjustment.
12. Retain copy for office file and return a copy to employee.

Appendix A - Alberta Association of Optometrists

Effective:	**October 2, 2015**
Program Type:	Voluntary. **Employee** Contribution. **Employee** responsible for the vision examination fee if provincial health care is not available.
Optical Lab:	Approved laboratory as listed in Manual Insert OVC-GI-2.
Safety Frames:	Any approved safety frame from approved list
Exclusions	No rimless or semi-rimless frames are allowed.
Side shields	Detachable or fixed side shields are required. Employee choice.
Lens Material:	
Glass	**NOT ALLOWED**
Plastic	Allowed.
Polycarbonate	NOT ALLOWED
Trivex	NOT ALLOWED
Hi – Index	Allowed provided sphere and cylinder when added together are greater than 6 diopters. ****Note lenses must not be less than 3 mm centre thickness****
Lens Treatments:	
S/R Coating	**ALWAYS** applied (No TD2/ hard coat allowed).
U/V Coating	Allowed, with prior authorization from the supervisor
A/R Coating	Allowed, with prior approval from the supervisor (No Forte/ Ice/ SHV)
Tints	Allowed, up to a 30% density
Photochromatics	NOT ALLOWED
Progressive Addition	Allowed if currently in dress eyewear
Special Materials:	If required please contact the AAO office (451-6824 – Edmonton or 1-800-272-8843) **prior to ordering.**

Appendix B - Saskatchewan Association of Optometrists

MANUAL INSERT **Revised:** October 2015

Confidential Property of the SAO - not for distribution

Exam:	Not covered through the SAO OVC, Employee to pay at office.
Program Type:	**Unless specified as an exception, Employer to pay complete.**
Ophthalmic Lab:	**HOYA Vision Care Canada**, Toll-Free Fax - 1-866-388-7174 Email: safety@hoyavision.com
Safety Frames:	Any approved frame on Schedule "D".
Side Shields:	**Detachable or Permanent** *Side Shields must be dispensed and worn *CSA Standard is Permanent
Case:	Soft case will be supplied.
Lens Materials:	
Plastic	Allowed
Trivex	NOT ALLOWED
Polycarbonate	NOT ALLOWED
Lens Treatments:	
Scratch Resistant Coating	**PREMIUM**
Ultra Violet Coating	Allowed - with prior supervisor authorization.
Anti-Reflective Coating	Allowed - with prior supervisor authorization.
Tint	Allowed - up to 30% density.
Transitions	NOT ALLOWED
Progressive Addition:	Allowed - only lens types on Schedule "B-1" may be used
Replacement/Repairs:	SAO extends a 1 year warranty on all frames; all other replacements or repairs require a new OVC authorization form.
Special Circumstances:	Prior to ordering, contact the SAO at 1-877-660-3937 or 652-2069.

TRANSPORTATION OF DANGEROUS GOODS (TDG)

16.0 TRANSPORTATION OF DANGEROUS GOODS (TDG)

16.1 Introduction

Transportation of Dangerous Goods Regulations was brought into effect to promote safety in the handling, shipping, transporting, and receiving of dangerous goods by air, rail, road, and marine modes. The regulations deal with four main areas - classification, documentation, safety marks, and training.

Anyone shipping, transporting, receiving or otherwise handling dangerous goods for the purpose of transporting them must be trained or working under the direct supervision of a trained person. A trained person must have a valid TDG training certificate with them at all times when handling TDG products.

Goods regulated under TDG fall into nine classes as listed below. Some of these classes are further divided depending upon the nature and degree of hazard they present.

16.2 Dangerous Goods Classification

- Class 1 Explosives
- Class 2 Compressed Gasses
- Class 3 Flammable Liquids
- Class 4 Flammable Solids, Spontaneously Combustible and Water Reactive Solids
- Class 5 Oxidizers and Organic Peroxides
- Class 6 Poisonous and Infectious Substances
- Class 7 Radioactive Materials
- Class 8 Corrosive Substances
- Class 9 Miscellaneous Dangerous Goods

16.3 General Considerations

a) A document (bill of lading, manifest etc.) containing certain information about the dangerous goods must accompany each shipment of the goods, unless a permit exempts the goods from this requirement.

b) Safety marks identify the dangerous goods and include placards, labels, and a variety of package markings.

c) The Canadian Association of Petroleum Producers (CAPP) makes available to Harvest and other members certain TDG exemption permits. These cover the transportation of certain goods without specific documentation. All Harvest Employees that carry dangerous goods on small quantities should have the appropriate permits in their vehicles at all times. Contact Harvest EH&S department for copies.

d) Further information concerning TDG and regulated products can be found in TDG Training Courses and the TDG Act and Regulations.

e) “Dangerous occurrences” must be reported immediately to the police, employer, vehicle owner, and the dangerous goods' owner. Such events would include spills, bulk container damage, fire explosion and transportation accident involving dangerous goods

WHMIS

17.0 WHMIS

17.1 Introduction

Before undertaking any work involving the use, handling or exposure to any hazardous materials, workers shall ensure that the required precautions are taken.

- They understand the hazards and the precautions to be taken.
- Approved personal protective clothing and equipment is worn.
- Adequate ventilation is provided and available.
- Approved fire protection is provided and available.
- First aid capability and facilities are available.

17.2 Workplace Hazardous Materials Information System (WHMIS)

Harvest Operations Corp. (Harvest) will comply with all aspects of the Federal and Provincial WHMIS Acts and regulations to ensure chemical hazards are identified evaluated and adequately controlled. The Company will also ensure that all workers are trained in WHMIS and that their customers are provided with the essential chemical health and safety information.

The Workplace Hazardous Materials Information System (WHMIS) is a Canada wide information system that reinforces a worker's right to know about the health hazards of materials used in the workplace. The system also provides information on how workers can protect themselves from its properties. The hazardous materials affected are referred to as "controlled products".

Controlled products are divided into six hazard classes, some of which are subdivided into divisions. The hazard classes are defined as follows:

Hazard Class	Hazard Description	Detail
Class A	Compressed Gasses	
Class B	Flammable & Combustible Material	
Class C	Oxidizing Material	
Class D -- Division 1	Poisonous & Infectious Materials	Materials causing immediate & serious toxic effects
Class D -- Division 2	Poisonous & Infectious Materials	Materials causing other toxic effects
Class D -- Division 3	Poisonous & Infectious Materials	Biohazardous infectious material
Class E	Corrosive Material	
Class F	Dangerously Reactive Material	

WHMIS provides three main thrusts toward providing health and safety information. They are labeling systems, safety data sheets and training programs.

a) There are two types of labeling required -- supplier labeling, which will generally have been applied to the controlled product by the supplier, and workplace labeling, which is the employer's and worker's responsibilities.
b) Safety data sheets (SDS) provide detailed information regarding the hazards, precautionary measures, and emergency information on a controlled product. SDS's must be readily available to all employees who work with or around controlled products.
c) Training is essential on how WHMIS works and on the proper use, handling, storage, and disposal of controlled products. Contractors shall ensure that their employees are trained.
d) Further information concerning WHMIS and controlled products can be found in WHMIS training courses and the SDS's at the workplace.

WORKING AT HEIGHTS

18.0 WORKING AT HEIGHTS

Task Summary: The following is an overview of the Working at Heights Safe Operating Procedures (SOP).

1. First determine if there is a danger of falling 3.0m or more from a temporary work area or 1.2m or more from a permanent work area with no guardrails

   Note: Situations may arise where work hazards (i.e., working over equipment or liquids) dictate the need for fall arrest protection at heights much less than those specified.
2. The Worksite Supervisor will decide if a Fall Protection Plan is required based on the type of work or the Safe Work Agreement (site specific orientation & hazard assessment) for the primary task
3. The fall hazards and the hazard control measures must be identified and discussed during the pre-job safety meeting, and recorded on the Safe Work Agreement or Fall Protection Plan.
4. Designate a safety backup person, if required.
5. Hold a pre-job meeting and review all aspects of the job.
6. The Fall Protection Plan must be attached to the Safe Work Agreement.
7. Consider alternatives in providing continuous fall protection for repetitive work
8. Fall arrest equipment may not be required for climbing portable ladders if the work is a light-duty task of short duration
9. Before climbing a fixed tank ladder, look for inspection tags and follow the three-point method for climbing a ladder. See Ladder Inspection Checklist
10. When using a suspended personnel basket, ensure the lanyard is connected to a proper anchor point on the lifting device
11. A full body safety harness must be worn by Harvest Operations Corp. (Harvest) employees
12. Before use, inspect all connecting equipment such as lanyards, D-rings, rope grabs, ladder safety devices, and retractable lifelines which are attached to full body safety harnesses
13. When calculating the workers weight also allow for the extra weight of any additional tools, equipment or supplies the worker is carrying or wearing
14. Identify the anchor points (i.e., pipe, structural steel or lifelines)

Primary Hazards: Injury caused by falling onto the ground or equipment and suspension trauma.

Required Forms, Checklists & Attachments	Harvest Reference Documents
1. Safe Work Agreement	1. Safe Work Agreement COP
2. Working at Heights Flow Chart	2. Cranes & Mobile Lifting Equipment SOP (under development)
3. Fall Protection Plan Form	3. Overhead Power lines SOP

18.1 Definitions

Anchor means an engineered component for coupling a fall arrest or travel restraint system to an anchorage.

Anchorage means a structure, or part of a structure, that is capable of safely withstanding any potential forces applied by a fall protection system.

Fall Arresting Device means a part of a worker's personal protective equipment that stops the worker's fall and does not allow the worker to fall farther.

Fall Protection System means

a) A personal fall arrest system,
b) A travel restraint system,
c) Fabric or netting panels intended for leading edge protection,
d) A safety net,
e) A control zone,
f) Use of procedures in place of fall protection equipment, or
g) Another system approved by a Director of Inspection.

Personal Fall Arrest System means personal protective equipment that will stop a worker's fall before the worker hits a surface below the worker.

Travel Restraint System means a type of fall protection system including guardrails or similar barriers that prevents a worker from travelling to the edge of a structure or to a work position from which the worker could fall.

Light-Duty Task means the work done at each spot where the ladder is set up must be less than approximately 15 minutes in duration. Examples of light duty tasks include:

a) All inspection-type work approved by Harvest
b) All maintenance-type work approved by Harvest such as:

- Changing light bulbs.
- Touch-up painting and caulking

c) Emergency repairs

18.2 Policy

This SOP applies to all employees and contractors working at Harvest facilities or at locations where Harvest is the contract operator. The practice describes the safe work procedures and regulatory requirements when using:

- Ladders, scaffolds, and other temporary work platforms.
- Fall/Travel restraint or fall arrest systems if there is the potential or danger of falling when working at heights.

Note: This SOP does not address the requirements for high-angle rescue, industrial rope access, suspended personnel baskets, stationary mobile cranes, and bucket trucks.

18.3 Regulatory Requirements (Fall Protection)

Alberta's Occupational Health and Safety Code (2009), Part 9, Fall Protection, requires workers to be protected from falling at a temporary or permanent work area if a worker may fall:

a) A vertical distance of 3m or more, or
b) A vertical distance of less than 3m if there is an unusual possibility of injury, or

Note: Unusual possibility of injury means the injury may be worse than from landing on a solid flat surface such as falling on moving/rotating equipment or heated surfaces.

c) A vertical distance of less than 3m but more than 1.2m in the case of a permanent work area where guardrails or other similar means of fall or travel restraint have not been provided, or
d) Into or onto a hazardous substance or object, or through an opening in a work surface.

Note: Examples include falling into storage tanks, open water, or falling onto stationary metal, piping, equipment, or heated surfaces, etc.

– Working alone is not permitted when using Fall Protection Equipment –

Notes:

1. The above requirements will be complied with at all Harvest worksites and facilities in Alberta, British Columbia, and Saskatchewan, as they state or incorporate in whole or in part interprovincial Fall Protection regulations.
2. A Safe Work Agreement must be issued for all work requiring fall protection equipment.
3. The words "temporary" and "permanent" describe the nature of the work being performed, not whether the work area is a temporary or permanent structure.
4. Drilling rig, steeplejack and rescue services will have their own work practices which must be submitted to Harvest Superintendent or designate for approval.

5. Rescue personnel involved in training or in providing emergency rescue services may use equipment and practices other than those specified in, or those which supersede the Alberta British Columbia, and Saskatchewan OHS regulatory requirements.

18.4 Responsibilities and Duties

18.4.1 Superintendents, Field Foremen, and Lead Operators

a) Ensuring the Working at Heights SOP is implemented and followed at all facilities and worksite locations in their area of responsibility.
b) Ensuring supervisors and workers are provided with the necessary fall protection training/ equipment and having a system in place to distribute regulatory requirements.
c) Ensuring that the risks of exposure to fall hazards are assessed, and controls (i.e., engineering, administrative or PPE) are implemented where necessary.
d) Selecting approved contractors who specialize in working at heights, installing fall protection and travel restraint systems, and/or providing high-angle rescue services.
e) Ensuring an inspection system is in place for portable ladders, fixed ladders (i.e., attached to tanks), scaffolds, elevating work platforms and all fall protection equipment.
f) Conducting routine safety checks, inspections, or audits to ensure the work procedures, fall protection systems, site specific orientation & hazard assessment, and control measures are being followed.

Note: Additional support and resources will be made available by the EH&S Team.

18.4.2 Worksite Supervisors and/or Designated Alternates

a) Ensuring workers (includes contractors) under their supervision are competent to perform their assigned job, understand and follow the requirements of this SOP.

Competent**,** in relation to a person, means adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

b) Developing, communicating, and implementing a Site-Specific Fall Protection Plan, if a worker may fall 3m or more and/or the worker is not protected by a guardrail or as required by the site specific orientation & hazard assessment, the Safe Work Agreement, or by an approved Critical Task/JSA.

c) Based on the type of work, the site specific orientation & hazard assessment, and the fall protection system selected, the Worksite Supervisor (in consultation with the Area Foreman) will decide if the level of risk exceeds the competency of Harvest personnel to safely conduct the work.

d) Ensuring new or transferred workers are shown the fall hazards particular to that worksite and the steps being taken to eliminate or control the fall hazards.

e) Ensuring workers who are required to climb portable or fixed ladders know the correct procedures for climbing the ladders and when fall arrest equipment is required.

f) Conducting annual equipment inspections/audits on portable and fixed ladders, elevating work platforms, and fall protection equipment. Tag scaffolds and fixed ladders green “Safe for Use”. All scaffolds, fixed and portable ladders that did not pass the inspection must be tagged red “Do Not Use” and removed from service or destroyed as required.

For further details, refer to Harvest’s Inspections SOP

g) Knowing the operating/assembly/maintenance procedures, regulatory and fall protection requirements for all equipment (i.e., scaffolds, scissor lifts, and work platforms) at the worksite.

Note: For rented or contract equipment, review work procedures and fall protection requirements with the operator prior to starting any work.

h) Keeping current and up to date with applicable provincial regulatory requirements and that fall protection equipment complies with the applicable CSA/ANSI Standard. In some cases, certain equipment may comply with earlier standards if purchased prior to July 1st 2009.

i) Ensuring equipment maintenance/inspection systems as per the manufacturer’s specifications are:

- Inspected prior to each use; defective equipment tagged and removed from service.
- Maintained in good working order and re-certified at specified intervals.

18.4.3 Workers

a) Following this SOP and being competent in the safe work procedures for the routine use of ladders (portable or fixed) or other fall protection equipment provided by Harvest.

b) Where fall restraint/arrest systems are required, workers will follow the procedures:

- Identified during the site specific orientation & hazard assessment and Safe Work Agreement process.
- Discuss, document, and implement the hazard control measures during the pre-job safety meeting.
- Agree to the conditions recorded on the Site-Specific Fall Protection Plan and Safe Work Agreement.
- In the event that the work scope or conditions change, work must be stopped and the hazards re-assessed, controls implemented and documented.

Note: Working alone is **not** permitted when using fall protection equipment.

c) Wearing and using the fall protection equipment/systems provided by Harvest.
d) Inspecting their fall protection equipment and removing from service and tagging any defective equipment and immediately notifying the Worksite Supervisor.
e) Checking equipment (i.e., scaffolds and fixed tank ladders) tags prior to their use.
f) Reporting to the Worksite Supervisor or the Harvest Authority any incident, damaged or missing guardrails, missing equipment tags, and/or unusual conditions which may occur during the work, and stopping the work if necessary.

18.4.4 Contractors Providing Fall Protection Services

a) Ensuring that workers are competent and certified in all aspects of fall protection.
b) Having a Fall Protection Plan in place at the worksite; no exceptions permitted.
c) Submitting their “Working at Heights” or “Fall Protection SOP for review by Harvest (includes training, incident or WCB records required by Harvest) as per the Harvest Contractor Management System.

18.5 Training Requirements

a) Workers required to perform work in which a fall protection plan and equipment is mandatory must receive on-the-job training and industry-approved certification in Fall Protection, using Fall Protection Systems and Fall Protection Plans based on the provincial regulatory requirements. New or transferred workers who have valid certificates in Fall Protection may be required to demonstrate their competence in its use, limitations, and maintenance to the Worksite Supervisor.

The minimum training, as noted above, must include the following:

1. A review of current Alberta, BC and/or Sask. legislation pertaining to fall protection.
2. What a fall protection plan is, when it's required, and their responsibilities.
3. Fall protection methods a worker is required to use at a worksite.
4. Identification of fall hazards at the worksite.
5. Assessment and selection of specific anchors that the worker may use.
6. Instructions for the correct use of connecting hardware.
7. Information about the effect of a fall on the human body, including:

    - Maximum arresting force allowed,
    - Purpose of shock and energy absorbers, and
    - Swing and free fall.

8. Pre-use equipment inspections (including the applicable CSA/ANSI Standards required for use under provincial regulations).
9. Emergency response procedures to be used at the worksite, if necessary, and
10. Practice in:

    - Inspecting, fitting, adjusting and connecting fall protection systems and components, and
    - Emergency response procedures.

Note: The Field Foreman and Worksite Supervisor must remain current with provincial training requirements and their application to Harvest's worksites.

b) Worksite Supervisors and Safety Watches who are directly involved in working at heights must have industry-approved certification in Fall Protection.
c) Rescue personnel must have industry-approved certification in Fall Rescue.
d) All workers must be orientated on the Harvest Working at Heights SOP, and the Harvest Emergency Response and Rescue Plans.
e) Contractors who provide services that require Fall Protection Systems must provide training records and valid certificates from an industry-approved agency.

18.6 Pre-Job Preparation

A Safe Work Agreement will be issued for the primary task, such as construction or maintenance work requiring the installation of fall protection/travel restraint systems, or a confined space entry that requires the use of a fall protection system for emergency extraction.

For low-risk routine work, such as using a stepladder to change light bulbs, the Worksite Supervisor will identify those jobs not requiring a Safe Work Agreement and ensure those worker(s) who are assigned those duties are competent to perform the job.

For non-routine work where it has been determined there is a danger of a worker falling 3m or more and the worker is not protected by guardrails and the vertical fall distance is more than 1.2m, then a Fall Protection Plan must be developed before the work begins.

Note: The 3m fall distance will be used in Alberta, BC, and Saskatchewan.

18.6.1 Fall Protection Plan

The Fall Protection Plan must specify the following:

a) The fall hazards at the worksite or work area and may include:

- Falling:
  - Through floor openings, shafts, fragile or brittle surfaces, or
  - From open edges of floors, temporary work platforms, unguarded walkways, trenches/excavations, roofs, or
  - From sloped, slippery or wet surfaces, changing levels, or
  - Into open tanks or water, or
  - Onto stationary/moving/rotating equipment, materials, or heated surfaces below.
- Falling or collapsing within a confined space due to a contaminated atmosphere.
- Being struck from objects falling from above.
- Lost hand grip on portable or fixed ladders.
- Improper or defective anchor points for fall protection equipment.
- Hazards (i.e., electrical or structural) within the swing radius of the fall protection system.
- Tipping hazards where ladders or scaffolds are placed on poor ground support, and/or uneven or sloping surfaces.
- Collapsing scaffolds or work platforms due to their incorrect assembly or overloading.
- Poor lighting, weather, and housekeeping hazards contributing to slips, trips, and falls.

b) Hazard control measures, based on the site specific orientation & hazard assessment will be selected according to the following order as per government regulations:

First: An engineering control such as a guardrail must be installed, or

Next: If the use of a guardrail is not reasonably practicable, a worker must use a travel or fall restraint system, or

Next: If the use of a travel or fall restraint system is not reasonably practicable, a worker must use a personal fall arrest system (safety net or control zone in Sask), or

Next: If the use of a personal fall arrest system, safety net or control zone is not reasonably practicable, a worker must use an equally effective fall protection system that complies with government regulations and must be approved by the Operations Manager (or designate) and/or professional engineer prior to its use. See Procedures in Place of Fall Protection for additional information.

c) Based on the type of work, the site specific orientation & hazard assessment, and the fall protection system selected, the Worksite Supervisor (in consultation with the Area Foreman) will decide if the level of risk exceeds the competency of Harvest personnel to safely conduct the work.

d) Clearance distances below the work area must be confirmed as being sufficient to prevent a worker from striking the ground or an object or level below the work area.

e) The anchors must be identified, checked, and verified that they are acceptable for use prior to attaching a fall protection system.

f) The procedures required to assemble, maintain, inspect, use, and disassemble the fall protection system.

g) The rescue procedures to be used if a worker:

- Falls and is suspended in their personal fall arrest system or safety net.
- Collapses or falls within a confined space and requires emergency extraction.

Note: Procedures for a failure of the lifting system for a suspended personnel basket, scissor lift, boom/bucket trucks, etc. must be available and reviewed prior to starting work.

h) Designate a Safety Watch, if required

i) The names of the workers, safety watch and rescue personnel.

j) Verification of training and fall protection/rescue certificates.
k) Record the time interval used to monitor the conditions affecting the Fall Protection Plan.

Note: The Worksite Supervisor may permit the use of either a generic or site-specific Fall Protection Plan that has been used previously for recurring low-risk work and the information applies in all aspects to the new job. The Worksite Supervisor or Harvest Operating Authority is required to periodically check to make certain that conditions affecting the Fall Protection Plan have not changed. In the event that the work scope or conditions change, work must be stopped and the hazards reassessed, controls implemented and documented.

18.6.2 Additional PPE Requirements

a) Fall protection equipment (i.e., full body harness, lanyards, lifelines, etc.)
b) Specialty clothing (includes flotation device)
c) Hand-held radios or some other means of communications

18.6.3 Pre-job Safety Meeting

A pre-job safety meeting will entail the review and documentation of the following by the work crew prior to starting the work; the fall hazards, control measures, worker responsibilities, emergency/rescue procedures, and all aspects of the Fall Protection Plan and Safe Work Agreement.

a) A Safe Work Agreement will be issued for the primary task such as construction, repairs, or maintenance (i.e., painting, cleaning, etc.).

Note: For work requiring fall protection, a Term Work Agreement is **not** permitted.

b) If a Fall Protection Plan is required, it must be attached to the Safe Work Agreement.
c) To complete a job-specific or non-routine procedure, it may be necessary to incorporate or consider other Harvest work practices such as Confined Space Entry.

For Example: Ensure fall protection equipment (full body harness, lifeline, lifting device) is used when entering a confined space from the top or where there is a fall hazard identified during the site specific orientation & hazard assessment process.

18.7 Procedures in Place of Fall Protection Equipment

In Alberta, procedures may be developed in place of fall protection equipment, if it's not reasonably practicable to use a fall protection system for work that may include:

a) Installation or removal of fall protection equipment,
b) Roof inspection,
c) Emergency repairs,
d) At-height transfers between equipment and structures if allowed by the manufacturer's specifications, and
e) Situations in which a worker must work on top of a vehicle, transporter or tanker.

Note: If anchors have been installed, then fall protection equipment must be used

A procedure in place of fall protection equipment must be developed according to the following:

a) A site specific orientation & hazard assessment must be completed before working at heights begins,
b) The procedures to be followed while performing the work must be in writing, available to workers, and reviewed during the pre-job safety meeting before the work begins,
c) The work is carried out in such a way that it minimizes the number of workers exposed to a fall hazard while the work is being performed,
d) The work is limited to light-duty tasks of limited duration,
e) The worker(s) performing the work is competent to do it,
f) When used for inspection, investigation or assessment activities, these activities take place prior to the actual start of work or after the work has been completed, and
g) The procedures do not expose a worker to additional hazards.

Note: A procedure in place of fall protection must be permitted by provincial regulation. In BC, the procedure must be approved by the WCB. In Saskatchewan, this procedure is not specifically addressed; therefore, clarification must be obtained from Saskatchewan OHS.

18.8 Site-Specific Fall Protection Plan

For further details, refer to Harvest's Site-Specific Fall Protection Plan in the Forms Section.

18.9 Continuous Protection for Repetitive Work

For repetitive maintenance work, consider installing continuous protection from fall exposure such as:

a) Installing guardrails, walls, or removable floor access plates,
b) Installing cable grabs or rail sliders on fixed ladders.
c) Implementing an operational change or work method,

d) Providing for alternative worker access, or
e) Installing a permanent travel or fall restraint system when a guardrail is not reasonably practicable.

Note: See also Procedures in Place of Fall Protection Equipment.

18.10 Suspension Trauma

A worker suspended in an upright position with their legs dangling in a harness of any type is subject to suspension trauma which is potentially a fatal situation. Gravity pulls blood into the lower legs and eventually (within 4 to 5 minutes) the return blood flow to the heart and brain is reduced causing the worker to lose consciousness. Death will occur if not rescued immediately.

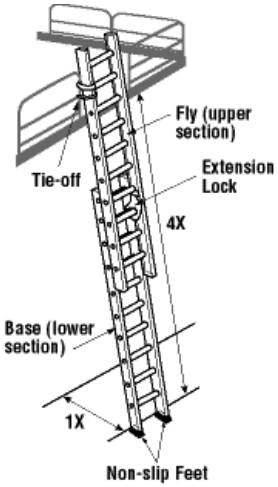
After a fall:

a) Workers must try to move their legs in the harness and push against any footholds.
b) Workers must try to get their legs as high as possible and their heads as close to horizontal as possible.

For rescue:

a) Rescuers must be trained to recognize suspension trauma and to implement the necessary recovery procedures (i.e., post-rescue death may occur if victims are moved to a horizontal position too rapidly).

18.11 Portable Extension Ladders



(Approved to CSA Standard CAN3-Z11-M81 (R2005), Portable Ladders)

a) Workers who may fall a distance of 3m or more while working from a portable ladder must use a fall arrest system.
b) This does not apply while a worker moves up or down a portable ladder. The worker must always maintain three points of contact when climbing the ladder. Fall protection may be required after the worker climbs and steps off the ladder.
c) If it is not reasonably practical to use a personal fall arrest system, then a worker may work from a portable ladder without fall protection if the work is a light-duty task (i.e., inspection, painting or emergency repairs) which means:

- The work done at each spot where the ladder is set up must be less than approximately 15 minutes in duration.

- While doing the task, the worker must keep their centre of gravity (indicated by the belly button) between the side rails of the ladder.
- The worker must maintain three points of contact whenever the worker extends an arm beyond the side rail.

Notes:

1. If any one of these three conditions cannot be met, some form of fall arrest protection is required.
2. If anchor points have been installed at that location, then fall protection must be used.

d) Ladders must be set up so that the base is out 1m for each 4m up.
e) Place the ladder feet on a substantial and level surface. Do not place ladders on moveable objects. Secure the base of the ladder if the surface is icy or slippery.
f) Ladders must extend 1 metre past the point of support. No work from top two rungs!
g) Extension ladders must have rung locks securely engaged with at least 1.0m overlap of the extensions.
h) For heights greater than 3m, the ladder will be held in place by a fellow worker while the other worker climbs and fastens the top of the ladder to the structure. If the ladder cannot be fastened to the structure; a worker must be positioned at ground level to hold the ladder while the other worker ascends or descends the ladder.
i) Always face the ladder when ascending, descending, or working from a ladder.
j) Do not rush while ascending or descending the ladder and never slide down a ladder. Take one rung at a time and do not skip rungs.
k) Set up barricades and warning signs when using a ladder in a doorway/passageway or where there is vehicular traffic nearby.

Note: For work requiring portable extension ladders to extend more than 6m, the Worksite Supervisor must evaluate the level of risk and consider alternative methods such as using a man lift or a scaffold. For detailed information on ladders and their use, review the provincial regulations.

18.11.1 General Rules for Straight or Extension Ladders

The safety requirements governing the condition and use of extension and straight ladders are as follows:

a) Portable wood or metal ladders or stepladders used by Harvest must be CSA-approved, commercially manufactured, and must be labelled for the grade of material used to construct the ladder and the use for which the ladder is constructed. Worksite constructed wooden ladders or single rail ladders are not permitted.

b) Ladder inspection: Visually inspect the ladder and check for the following defects.

- Loose/broken steps or rungs.
- Loose nails, screws, bolts, rivets or other metal parts.
- Damaged/worn or missing non-slip bases.
- Bent/cracked uprights or rungs.
- Slivers/splinters on uprights, rungs, or steps.
- Missing, worn, or frayed rope.

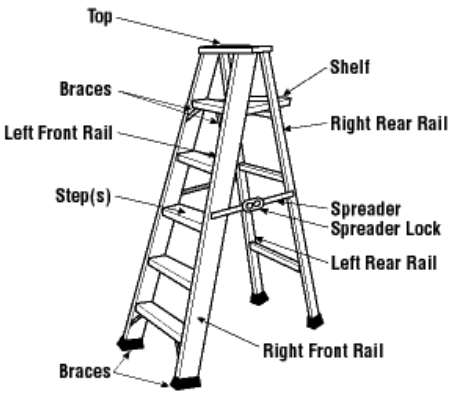
c) Steps, rungs, and uprights must be free of excess grease, dirt, or oil.
d) Ladders used for electrical work must be paint-free wooden ladders or ladders made of non-conductive materials (i.e. fibreglass).
e) Ladders are designed for one-man use only.
f) Do not jump from a ladder. Check footing before descending a ladder.
g) Never attempt to adjust ladder while you are or someone is standing on the ladder.
h) Hoist and lower materials by rope after climbing the ladder.
i) Move the ladder as the work progresses; don't overreach or extend your arm or body.
j) Get help when handling or moving heavy or long ladders.
k) Ladders must be in good condition and be equipped with a non-slip base.
l) Ladders that are found defective must be tagged "Do Not Use" and either repaired or discarded.
m) The ladder must be placed on a firm base; ensure it is tied off or held while in use.
n) Before climbing a ladder, clean your boots if they are muddy or slippery. Avoid climbing with wet soles.

18.11.2 Stepladders

(Approved to CSA Standard CAN3-Z11-M81 (R2005), Portable Ladders)

a) Ensure stepladders are in good condition and the spreader or locking device is fully engaged.
b) Place the stepladder so that all four legs have secure footing with treads in a level position.
c) Face the stepladder when ascending or descending.
d) Do not:

- "Shift" or "walk" a stepladder when standing on it.



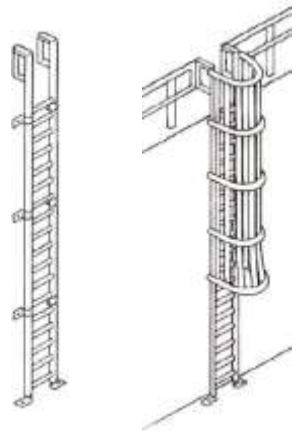
- Do not straddle or sit on the top of the stepladder.
- Stand on the top two steps of the stepladder.
- Use a stepladder as a brace or as a support for a work platform or plank.
- Use as a lean-to ladder or like an extension ladder.
- Place stepladders on boxes, unstable bases, or on scaffolds to gain additional height.

e) Steps, rungs and uprights must be free of excess grease, dirt or oil.
f) Stepladder inspection: Visually check for the following defects.

- Loose or bent hinge spreaders.
- Loose hinges, nails, screws, bolts, rivets, or other metal parts.
- When setting up the ladder, it does not wobble from side to side.
- Lock on hinge spreader is broken.
- Loose/broken steps or rungs.
- Damaged/worn or missing non-slip bases.
- Slivers/splinters on uprights, rungs, or steps.
- Bent/cracked uprights or rungs.

18.11.3 Ladder Storage

a) Store ladders in a location where they are not exposed to the weather or subjected to excessive heat or dampness. Do not hang ladders from their rails or rungs.
b) When storing a ladder in a horizontal position, support it at a sufficient number of points to avoid sagging which could result in a permanent set.
c) When transporting, pad racks on the vehicle with soft material to reduce wear/road shocks.



18.12 Fixed Ladders

(Constructed to PIP Standard STF05501 (February 2002), Fixed Ladders and Cages)

a) A ladder attached to a scaffold or tank must extend at least 1m above the uppermost working level of the scaffold or tank top to provide workers with handholds when getting onto or off of the ladder.
b) When working from or on a fixed ladder at a height of 3m or more and there is no protection by a guardrail, continuous protection from falling must be provided by equipping the fixed ladder with an integral fall protection system that meets the requirements of CSA Standard Z259.2.1-98 (R2004), Fall

Arresters, Vertical Lifelines, and Rails, or use an alternate fall protection system.

c) Fall protection is not required when climbing a fixed ladder or performing light-duty tasks of short duration. However, fall protection is required if working on the top of a tank or if the fixed ladder is greater than 9m (in Sask 6m) of unbroken length.

d) A ladder cage is required if a fixed ladder has a fall potential of 6 metres or more.

Note: Harvest will conduct a site specific orientation & hazard assessments and, where required, install fall protection devices such as ladder cages, cable grabs, or rail sliders on fixed ladders.

18.12.1 Climbing Fixed Ladders on Storage Tanks

Procedure limitations: This procedure is limited to climbing (ascending and descending) fixed ladders. Any activity beyond climbing (e.g., tank gauging, thief hatch inspection, etc.) must adhere to the requirements outlined in this Harvest Working at Heights SOP.

a) Prior to climbing a fixed ladder, workers will conduct the following inspection:

1. Check the ladder for a green “Safe for Use” inspection tag.

Note: Do not use the ladder if there is a red “Do Not Use” inspection tag.

2. Ensure all rungs of the ladder are present and free of oil, grease, dirt, ice, or snow.
3. Check for damaged/defective steps, rungs, side rails, cage structure, and look for corrosion.

Note: Report all damage and rust on the welded joints between the ladder rungs and the support structure to the Worksite Supervisor and attach a red “Do Not Use” tag.

4. Check to ensure the fixed ladder is securely attached to the tank.
5. Ensure the ladder is located directly below the handholds on the tank.

b) Because of the potential slipping hazards resulting from rain, steam, or ice build-up and the possibility of tank top collapse from corrosion, workers must ensure they do not stand, walk directly on tank tops, or jump from one tank to another.

Note: If it is necessary to work on a tank top, use decking or scaffolding and obtain approval from the next Harvest level of supervision. See Scaffolding for details.

c) For tank gauging, the Worksite Supervisor will identify those tanks requiring fall arrest equipment and issue a Safe Work Agreement. For further details, refer to Harvest's Climbing Ladders in Critical tasks and JSA's.
d) Working Alone is not permitted when fall protection is required.
e) When climbing fixed ladders:

1. The three-point method of climbing the ladder must be used. Keep your torso centered between the ladder rails.
2. To prevent the build-up of static electricity, ground yourself to the stairwell or ladder prior to reaching the top of the tank.
3. Hoist up gauge, tapes, or sample containers in order to keep hands free for climbing the ladder.

f) Fixed Ladder Inspection: Visually check for the following defects:

- Loose, worn, and damaged rungs or side rails
- Damaged or a corroded cage
- Corroded guard, bolts, and rivet heads
- Damaged or corroded handrails and brackets on platforms
- Broken or loose anchorages
- Weakened or damaged rungs on brick or concrete slabs
- Defects in climbing devices, including loose or damaged carrier rails or ropes
- Slippery surfaces from oil and ice
- Clutter obstructing the base of ladder or platform

18.12.2 Ladder Inspection Program and Checklist

All portable ladders, stepladders and fixed ladders will be inspected by the Worksite Supervisor, or by a competent Harvest employee, or by an approved contractor according to Harvest's inspection requirements or government regulations. A ladder inspection checklist is found on the next page.

For further details, refer to Harvest's Inspections in the Forms Section.

18.13 Scaffolds

(Approved to CSA Standard CAN/CSA-S269.2-M87 (R2003), Access Scaffolding for Construction Purposes)

a) Scaffolds used for construction, maintenance, or removal of equipment shall be constructed, erected, maintained, and used in accordance with applicable government regulations and industry standards. Consult the Alberta or BC OHS Explanation Guides or Saskatchewan Regulations for detailed instructions and specifications for scaffolds.
b) All scaffolding must be erected and anchored in such away as to prevent accidental movement and must be equipped with guardrails and toe boards if the working height exceeds 3 metres, or if the scaffold is erected over an area where others will be working.
c) Scaffolds and their components must be capable of supporting at least four times the maximum intended load. Scaffolds must not be loaded in excess of their maximum-rated load.
d) Workers must not perform any work from a ladder that is used to give access to the working levels of a scaffold. Standing on a mid-rail or the top rail to complete work tasks is not permitted.
e) Safe clearance distances to overhead power lines must be maintained.

For further details, refer to Harvest's Overhead Power SOP.

18.13.1 Scaffolds – General Construction Requirements

a) A scaffold must be erected with the vertical members plumb and with the ledgers and bearers level.
b) The base of a scaffold must have bearing plates or sills that rest on a solid surface and are sufficient to support the weight of the scaffold.
c) The poles, legs, and uprights of a scaffold must be securely and rigidly braced to prevent movement.
d) A scaffold must be effectively guyed to adequate anchors or rigidly secured to a building or structure if the height of the scaffold exceeds three times its minimum base dimension.
e) Unless otherwise specified by the manufacturer, height adjustment devices must not extend more than ⅔ of their total length or 60cm (24in), whichever is less.

18.13.2 Scaffold - Tagging Requirements

The Worksite Supervisor must ensure that the scaffold is tagged at each point of entry to indicate its status and conditions, and is to be tagged as follows:

Colour of Inspection Tag	Wording to Appear on Tag
Green	"No Restrictions"
Yellow	"Caution" and Write the Precautions on the Tag
Red	**"Do not use"**
No Tag	**"Do not use"**

A tag attached to a scaffold expires 21 calendar days after the date of the last inspection and must include the following information:

a) The duty (i.e., light or heavy loads) rating of the scaffold,
b) The date on which the scaffold was last inspected,
c) The name of the competent worker who last inspected the scaffold,
d) Any precautions to be taken while working on the scaffold, and
e) The expiry date of the tag.

18.13.3 Scaffolds – General Safety Requirements

a) Climb the scaffolding using the ladder; never climb on braces.
b) Ensure good housekeeping is practiced.
c) Ensure that equipment and materials are raised and lowered using a rope.
d) Immediately replace any guardrails temporarily removed for the purpose of hoisting equipment or materials.
e) Never remove any structural part of the scaffold without first checking to ensure structural integrity.
f) Never place a load on the scaffold greater than the design capacity.
g) Never rest or place materials on the guardrails.
h) Never undermine the base of the scaffold.

18.13.4 Scaffolds - Rolling

When working with rolling scaffolds, the user must:

a) Secure or remove all materials and equipment from the platform before moving the scaffold.
b) Standing on a mid-rail or the top rail to complete work tasks is not permitted.
c) Apply the wheel locking devices (or block the wheels) at all times when the scaffold is stationary. Deploy outriggers, if provided.
d) The height of a free-standing or rolling scaffold is not more than 3 times its smallest base dimension.
e) Have sufficient help available when moving a rolling scaffold (if required).
f) Be alert for hazards when moving the rolling scaffold (i.e., holes in floors, overhead obstructions, slopes, and debris).

Note: Riding a moving scaffold is not permitted.

18.14 Guardrails and Floor Openings

a) Whenever guardrails or toe boards are removed from service to perform work, another form of fall protection must be used. The guardrail and toe board must be replaced whenever the work area is to be left unattended or upon completion of the work.
b) Standard guardrails, mid rails, and toe boards must be positioned along the exposed sides of permanent platforms where the fall potential is 1.2m or more.
c) Standard stair railings must be positioned on the open sides of any steps that have four or more risers.
d) Floor and ladder way openings where there is a potential for a worker to fall through, slip, trip or fall on, must be securely covered with a cover of adequate size and strength (360 Kg in Sask.) or guarded by fixed or movable guardrails, which must be identified as such and kept in place except when necessarily removed to work in the opening covered and will then have a guardrail with toe boards installed around the opening.
e) The floor or ladder opening must have a warning sign that clearly indicates the nature of the hazard.
f) At the entrance to a ladder way or platform, a self-closing, double bar safety gate or equally effective means must be provided at the opening to prevent workers from walking directly into the opening and falling.

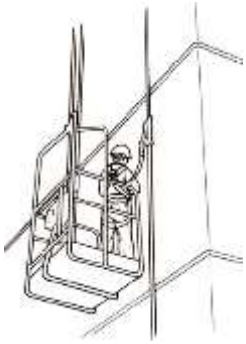
18.15 Working Over Water or Liquids

Workers must use and wear a fall protection system in combination with a life jacket or personal flotation device when working over open tanks, water (includes river ice) or liquids that exposes the worker to the hazard of drowning.

18.16 Elevating Work Platforms, Suspended Scaffolds and Suspended Personnel Baskets

a) Workers must use a personal fall protection system (i.e., full body harness, lanyard) that is safely secured to an anchor point in order to restrict movement and prevent a fall or ejection from a scissor lift, elevating work platform, or forklift truck platform.

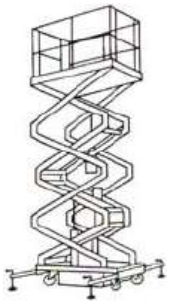
b) If no anchor is provided or specified by the manufacturer, an anchor point must be installed or specified and certified by a professional engineer that meets the requirements of CSA Standard Z259.16-04, *Design of Active Fall Protection Systems*.



c) In all cases when connected to an anchor, the lanyard, if reasonably practicable, should be short enough to prevent the worker from being ejected from the work platform or aerial device but is long enough to allow the worker to perform their work.

d) Workers hoisted in a suspended personnel basket must use a personal fall protection system (full body harness, lanyard and lifeline) with the lifeline attached to an anchor point.

e) Suspended personnel baskets must be commercially manufactured and erected, used, operated and maintained in accordance with the manufacturer's specifications or specifications certified by a professional engineer.



f) Workers on a suspended scaffold or swing stage must use a personal fall arrest system (full body harness, lanyard and lifeline) with the lifeline attached to an anchor point that is independent of anchor points supporting the suspended scaffold or swing stage.

g) For each scissor lift, elevating work platform (includes those mounted on a forklift) or self-propelled lifts in use at a workplace:

- The platform must be equipped with one anchorage point for each occupant.
- Use a travel restraint system to restrict movement and if movement cannot be safely restricted in all directions, a fall arrest-system must be used.
- Standing on a mid or the top rail to complete work tasks is not permitted.

- Regardless of the height or manufacturer's instructions, Harvest requires all workers to use a travel/fall restraint or fall arrest system when working from any scissor lift or elevating platform operating with all guardrails and chains in place.
- **In Alberta and Saskatchewan**, a hazard assessment must be completed to identify the requirement for equipping a self-propelled scaffold or man-lift with a motion alarm or flashing light to warn other workers when it's moving.
- **In British Columbia**, this equipment must have a warning system consisting of an intermittent horn or flashing light that:
  - Is automatically activated during any motion of the work platform, and
  - Can be seen or heard by other workers in proximity to the work platform.

- The scissor lift, elevating work platform, forklift must be operating on a firm, substantially level surface.
- The equipment manufacturer's operating and maintenance manual must be available at the workplace before the equipment is used.

Note: These anchor points must be specified by the manufacturer or certified by a professional engineer and meet the requirements of CSA Standard Z259.16-04, *Design of Active Fall Protection Systems*.

18.17 Fall Protection System

A fall arrest system is used to stop a worker's fall before they hit the surface below and may include the following:

a) Fall arrest system, or
b) Travel restraint system, or
c) Control zone and safety net, or
d) Fabric or netting panels intended for leading edge protection, or
e) Use of procedures in place of fall protection equipment, or
f) Any other system (i.e., guardrails, scaffolds, work platforms, aerial lifts, etc.) as determined by the site specific orientation & hazard assessment or site-specific procedures which provide the necessary safeguards or alternative worker access, or
g) Another system approved by a Director of Inspection.

All components of a fall protection system must be compatible with one another and with the environment in which they are used.

18.18 Safety Harness, Lanyards, and Belts

A fall arrest system is used to stop a worker's fall before they hit the ground, an object, or a level below the work area. The personal fall arrest system must limit the maximum arresting force on a worker to 6 kilonewtons (kN), unless the worker is using an E6-type shock absorber in accordance with the manufacturer's specifications; in which case, the maximum arresting force must **not** exceed 8 kilonewtons (kN).

18.18.1 Safety Harness

(Approved to CSA Standard CAN/CSA Z259.10 - 06, Full Body Harnesses)

a) All Harvest employees must wear a full body safety harness whenever connected to a travel restraint or fall arrest system. The use of a safety belt is not permitted.

Exception: Approved contractors may use safety belts for travel restraint system only.

b) All metal parts and hardware attached to personal fall arresting system components must have a load arresting capacity of no less than 22.2 kilonewtons (kN).

c) The full body harness must be approved to CSA Standard CAN/CSA Z259.10-06 and be clearly labelled as such on the harness.

Inspect the harness for worn, cut, frayed, burnt, or damaged fibres on both sides and edges of the webbing. Check carefully around all buckles, grommets, and tongues.

Wearing the harness:

- Remove any objects in your pant and shirt pockets when wearing a body harness.
- Ensure shoulder straps are equally balanced with the D-ring in the mid-chest area.
- Tuck in any loose strap ends or clothing.
- Sub-pelvic straps should be adjusted to comfortably take any force from either a fall or suspension. Straps should be snug enough to allow your fingers to pass under.
- Once on, have another person check the harness.

18.18.2 Shock Absorbing Lanyards

(Approved to CSA Standard CAN/CSA-Z259.11-05)

Shock absorbers or shock absorbing lanyards, used as part of a fall arrest system, must be used according to applicable regulations and meet the requirements of CSA Standard CAN/CSA-Z259.11-05, *Energy Absorbers and Lanyards*.

a) A shock absorber must be incorporated into the worker's personal fall arrest system:

- If a worker may fall a vertical distance of more than 1.2m.
- When a lanyard made of wire rope or other inelastic material is used, or a vertical lifeline made of wire rope is used.
- If a shock absorber is used, the total free fall must be limited to 2m or the limit specified in the manufacturer's instructions, whichever is less.

Note**:** See Section 6.20 to calculate the clearance distance.

b) The use of a shock absorber with a fixed ladder; the fall arrest system is optional unless required by the Fall Protection Plan or the manufacturer of the fall arrest system.

c) When a shock absorber is used in a fall arrest system, allowance must be made for the potential increase in the total fall distance. Use dry shock absorbing lanyards.

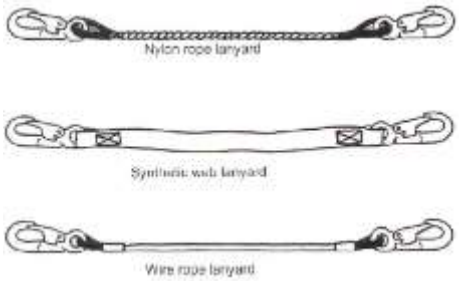
d) Select the shortest length lanyard that will still permit unimpeded performance of the worker's duties.

e) Secure the lanyard to an anchor point no lower than the worker's shoulder height but higher than their feet; see Section 6.20 for additional information.

f) Inspect all lanyards for cracks, sharp edges, deformation, corrosion, chemical attack, welding burns, and excessive wear.

g) When working near an energized conductor or in a work area where a lanyard made of conductive material cannot be safely used, the Worksite Supervisor must ensure the worker uses another effective means of fall protection.

18.18.3 Non-Shock Absorbing Lanyards



(Approved to CSA Standard Z259.11-05)

Non-shock absorbing lanyards must be selected and used according to applicable regulations and meet the requirements of CSA Standard Z259.11-05, *Energy Absorbers and Lanyards.*

Note: A non-shock absorbing lanyard can only be used in a travel restraint system.

a) The Worksite Supervisor will decide when and how non-shock absorbing lanyards will be used based on the site specific orientation & hazard assessment and the type of travel restraint system. In all cases, there must not be a danger of falling more than 1.2m.

b) If a tool or corrosive agent is used that could sever, abrade or burn a lanyard, then the lanyard must be made of wire rope or other material appropriate to the hazard.

c) When working near an energized conductor or in a work area where a lanyard made of conductive material cannot be safely used, the Worksite Supervisor must ensure the worker uses another effective means of fall protection.

d) When using a non-shock absorbing lanyard as part of a travel restraint system:

- Select the shortest length lanyard that will still permit unimpeded performance of the worker's duties.
- Secure the lanyard to an anchor point no lower than the worker's shoulder height but higher than their feet; see the following Section 6.20 for additional information.
- Use only a single lanyard between the worker and the travel restraint system or anchor.
- Lanyards must not be used for hoisting equipment and materials.

18.18.4 Safety Belts

(Approved to CSA Standard CAN/CSA-Z259.1-05)

a) Harvest employees must not use safety or body belts as part of a fall arresting system or travel/fall restraint system.

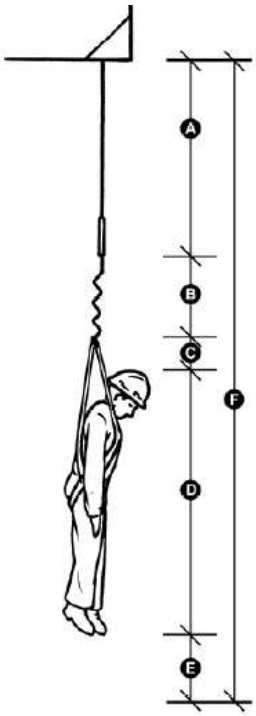
b) Approved contractors may use safety belts as part of a travel restraint system to keep workers away from the edge of a work platform, open structure, or roof top.

Note: Safety belts must meet the requirements of CSA Standard CAN/CSA-Z259.1-05, *Body Belts and Saddles for Work Positioning and Travel Restraint*.

18.19 Calculating Clearance Distances

The following is an example of how to calculate the minimum clearance distance below an anchor point based on a worker's fall arrest system.

Note: When calculating the worker's weight, make an allowance for the extra weight of any additional tools, equipment, or supplies the worker is carrying or wearing.



Assumptions:
The worker is 1.8 m (6 ft.) tall using a 1.8 m (6 ft.) long lanyard. The combined weight of the worker, clothing, and tool belt is at least 100 kg (200 lbs).

A Length of lanyard – 1.8 m (6 ft.)

B 1.1 m (3.5 ft) due to shock absorber pulling apart

C Harness stretch plus D-ring sliding – 0.45 m (1.5 ft.)

D Height of worker – 1.8 m (6 ft)

E Safety factor – clearance below feet of 0.9 m (3 ft.)

F A+B+C+D+E
Overall minimum clearance is 6.0 m (20 ft.)

Regulatory Requirements

1. A personal fall arrest system must be arranged so a worker cannot hit the ground or an object or level below the work area.
2. The personal fall arrest system maximum arresting force on a worker to 6 kilonewtons or 8 kilonewtons if an E6 type of shock absorber is used as per manufacturer's instructions.
3. Maximum free fall is 2m or the limit specified in the manufacturer's instructions, whichever is less.
4. Limit the vertical distance of a fall by
   a) Selecting the shortest length lanyard that will still permit unimpeded performance of the worker's duties.
   b) Securing the lanyard to an anchor no lower than the worker's shoulder height.

Note: If a shoulder high anchor is not available, then secure the lanyard to an anchor that is located as high as is reasonably practicable above the worker's feet, but the above points 1, 2 and 3 must still be met.

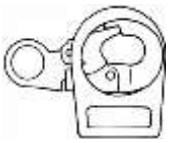
This worker's needs approximately 6m (20ft) of clear space below the anchor point.

18.20 Connecting Equipment

All connecting components consisting of carabineers, D-rings, O-rings, oval rings, self-locking connectors, and snap hooks must meet the requirements of applicable regulations and CSA Standard Z259.12-01 R2006, *Connecting Components for Personal Fall Arrest Systems (PFAS)*. They must be marked with their breaking strength in the major axis and the name or trademark of the manufacturer.

18.20.1 Lanyard Snap Hooks

a) Snap hooks must be of the locking type, requiring two consecutive deliberate manual actions to open the hook, to prevent rollout or accidental disengagement.
b) Check the hook for stretch or distortion, observing if the gate has been damaged or altered in any way, and if the locking action is functioning correctly.
c) Always check snap hook connections visually.



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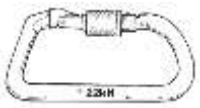
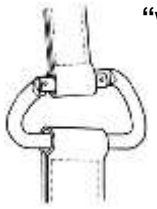
18.20.2 Carabineers



a) Carabineers are most commonly used to connect the lanyard to an anchor point.
b) Carabineers must be self locking and require two distinct and separate actions to open the gate mechanism.
c) Do not place the carabineer in an orientation that directly loads the gate mechanism.
d) Only steel carabineers are permitted.
e) Carabineers must have a load capacity of 22.2 kilonewtons (kN) and identified as such.



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18.21 Anchor Points

A worker using a personal fall arrest or travel restraint system must ensure that it is safely secured to an anchor point that complies with Alberta, BC or Saskatchewan requirements.

The following values do not apply to horizontal lifeline systems as the potential forces can be much greater; see Sections 6.26 and 6.27 for additional information.

Minimum Breaking Strength in kN Alberta regulatory requirement with BC and SK	**Temporary or Permanent Anchors**
A minimum breaking strength in any direction in which the load may be applied of at least **3.5** kilonewtons (kN) per worker attached.	Temporary anchor for **travel restraint** systems.
Capable of safely withstanding the impact forces applied to it and has a minimum breaking strength per attached worker of **16** kilonewtons (kN) **(22 kN in BC, 8.75 in SK)** or two times the maximum arresting force in any direction in which the load may be applied.	Permanent anchor for **travel restraint** systems.
A minimum breaking strength in any direction in which the load may be applied of at least **16** kilonewtons (kN) **(22 kN in BC, 22.2 in SK)** or two times the maximum arresting force per worker attached.	Temporary anchor for **personal fall arrest** system in Alberta, BC, and Saskatchewan.
Capable of safely withstanding the impact forces applied to it and has a minimum breaking strength per attached worker of **16** kilonewtons (kN) **(22 kN in BC, 22.2 in SK)** or two times the maximum arresting force in any direction in which the load may be applied.	Permanent anchor for **personal fall arrest** systems.
Important Note: Prior to installing any temporary or permanent anchor, always check the provincial minimum breaking strength requirements as they change periodically.	

a) All travel restraint anchors must be permanently marked “for travel restraint only”.
b) Anchors rated at two times the maximum arresting force must be designed, installed, and used in accordance with the manufacturer’s specifications or specifications certified by a professional engineer.
c) All new anchor points must be certified by a professional engineer and meet the applicable requirements of CSA Standard Z259.16-04, *Design of Active Fall-Protection Systems*.
d) Temporary anchors must be installed, used, and removed according to the manufacturer’s specifications or specifications certified by a professional engineer. They must be removed from use when the work is completed or at the time specified by the manufacturer or by a professional engineer.
e) A damaged anchor must not be used until the anchor is repaired, replaced, or re-certified by the manufacturer or a professional engineer.

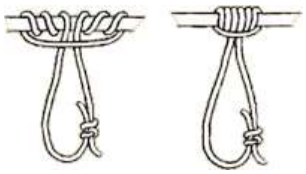
f) The Area Forman and Worksite Supervisor must ensure that workers use an anchor connector appropriate to the work and the fall protection system used.
g) An anchor to which a personal fall arrest system is attached must not be part of an anchor used to support or suspend a platform.

18.21.1 Anchor Slings

A wire rope sling used as an anchor must be terminated at both ends with a flemish eye splice rated to at least 90 percent of the wire rope's minimum breaking strength.

Inspect prior to use for cracks, dents, sharp edges, wickers, deformation, kinks, corrosion, chemical attack, or excessive wear.

18.22 Prusik and Similar Knots



a) Workers will only use a Prusik or similar sliding hitch knot in place of a fall arrestor during emergency situations (includes training simulations).
b) These knots must only be used by experienced and competent rescue personnel.

18.23 Other Fall Arrest Equipment

All other fall protection equipment must comply with applicable regulatory requirements and meet CSA standards:

a) Fall arresting devices such as rope grabs must meet the requirements of CSA Standard Z259.2.1-98 (R2004), *Fall Arresters, Vertical Lifelines, and Rails*.
b) Self-retracting devices used with personal fall arrest systems must meet the requirements of CSA Standard Z259.2.2-98 (R2004), *Self-Retracting Devices for Personal Fall-Arrest Systems*.
c) Automatic and manual descent control devices must meet the requirements of CSA Standard Z259.2.3-99 (R2004), *Descent Control Devices*.
d) Life safety ropes used in fall protection systems (i.e., swing stages) must meet the requirements of CSA Standard CAN/CSA-Z259.2.1-98 (R2004), *Fall Arresters, Vertical Lifelines, and Rails*.

18.24 Vertical Lifelines

(Approved to CSA Standard Z259.2.1-98 (R2004), Fall Arresters, Vertical Lifelines, and Rails)

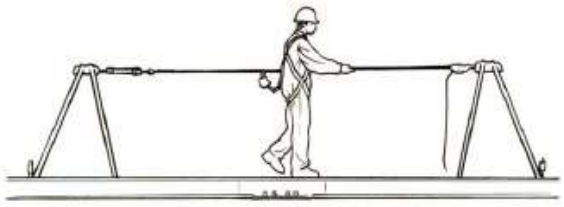
a) Vertical lifelines must have a breaking strength specified by the manufacturer of at least 27 kilonewtons (kN).
b) Permanent or temporary anchor points must comply with the breaking strength required by Alberta, BC and Sask. The anchor point must not be used to suspend any platform, another worker, or any other load.
c) They must be installed and used in a manner that minimizes the swing-fall hazard and must extend to within 1.2m of the ground or safe work surface. Ensure the lifeline is protected at the lower end so it cannot be fouled by any equipment.
d) The lifeline must be free of splices and knots except at the terminations and is protected by padding where the lifeline passes over sharp edges. It must be protected from heat, flame or abrasive or corrosive materials during its use.
e) Only one worker may be attached to a vertical lifeline, unless it is used as part of a ladder safety device as per manufacturer's specifications and certified by a professional engineer.
f) Lifeline by a cable or rail grab attached to the D-ring on the full body harness.

18.25 Flexible Horizontal Lifelines

(Approved to CSA Z259.13-04)

A flexible horizontal lifeline system must meet the requirements of:

a) CSA Standard Z259.13-04, *Flexible Horizontal Lifeline Systems*, or
b) The applicable requirements of CSA Standard Z259.16-04, *Design of Active Fall-Protection Systems*.



Before a horizontal lifeline system is used, a professional engineer, a competent person authorized by the professional engineer, the manufacturer, or a competent person authorized by the manufacturer certifies that the system has been properly installed according to the manufacturer's specifications or to specifications certified by a professional engineer.

18.26 Rigid Horizontal Fall Protection System

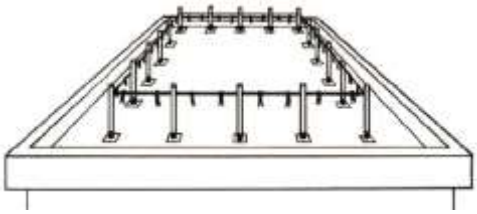
A rigid horizontal fall protection system must be designed, installed, and used in accordance with:

a) The manufacturer's specifications, or
b) Specifications certified by a professional engineer.

Before a rigid horizontal fall protection system is used, a professional engineer, a competent person authorized by the professional engineer, the manufacturer, or a competent person authorized by the manufacturer certifies that the system has been properly installed according to the manufacturer's specifications or to specifications certified by a professional engineer.

18.27 Control Zones

Control zones must only be used when all other fall restraint systems and safeguards previously described are found to be impractical or will result in a hazard greater than if the system was not used. If a control zone is used:



- The surface must be level (less than 4 degrees of outward slope) and excludes skeletal structures or during the erection/removal of scaffolds.
- The width of the control zone from the unguarded edge must be at least 2m.
- Additional width must be added to allow for slippery surfaces or increased risk presented by equipment working near the control zone.
- It must be clearly marked with an effective raised line or other equally effective method.
- Workers who cross a control zone must take the most direct route.
- Workers who must cross the control zone to enter or leave the work area are not required to use a fall protection system.

Note: Sides and edges are considered "unprotected" when there is no wall or guardrail system at least 920mm (36in) high. This does not apply to entrances, exits, and points of access.

18.28 Working on Vehicles and Loads

Harvest will conduct site specific orientation & hazard assessments and, where required, will verify the development and implementation of procedures in place of fall protection systems as per provincial regulations

18.29 Inspection and Maintenance

Safety belts, harnesses, lanyards, lifelines, connecting hardware, anchors and other similar devices must be:

a) Inspected by the worker before use on each work shift,
b) Kept free from substances and conditions that could contribute to their deterioration,
c) Maintained in good working order,
d) Inspected according to company policy (i.e., fixed tank ladders annually), and
e) Re-certified as specified by the manufacturer.

Records must be kept of inspections, maintenance, repairs or modifications for all suspended personnel baskets, elevating platforms, or other fall protection equipment required by provincial regulations.

18.30 Removal from Service

All fall protection equipment that is found to be defective in condition or function must be tagged, removed from service and the condition reported to the Worksite Supervisor. This tagged equipment must be either returned to the manufacturer for testing or destroyed.

Defective in condition means it has come into contact with excessive heat, a chemical, or any other substance that may corrode or otherwise damage the fall protection system.

After a fall arrest has occurred, the entire fall arrest system must be:

- Removed from service, and
- Not returned to service until it has been inspected and re-certified as safe for use by the manufacturer, its authorized agent, or by a professional engineer.

18.31 Regulations and Standards

All supervisors and workers shall manage, administer, and perform work requiring fall protection in compliance with the following codes, regulations, and standards:

a) Alberta OHS Code: Parts 8, 9, and 23: Ladders, Fall Protection, and Scaffolds
b) British Columbia OHS Regulations: Parts 11 and 13: Fall Protection, Ladders, and Scaffolds
c) Saskatchewan OHS Regulations: Part 7, 9, and 12: PPE, Fall Protection, and Scaffolds
d) Applicable CSA and ANSI Standards found in the Alberta and Saskatchewan Occupation Health and Safety Code and British Columbia OHS Regulations

SAFE WORK GUIDELINES

3.5 SAFE WORK GUIDELINES

3.5.1 Flame Resistant Clothing

3.5.2 Health Surveys Summary

3.5.3 *Hot & Cold (under development)

3.5.4 Off Lease Monitoring & Control

3.5.5 Vehicle Recovery & Towing

3.5.6 Workplace Violence

***Forms currently under development.**

FLAME RESISTANT CLOTHING

1.0 FLAME RESISTANT CLOTHING

1.1 Policy

The Flame resistant clothing policy must be applied when conducting work on any Harvest Operations Corp. (Harvest) work sites in which there is a potential for exposure to a hydrocarbon flash fire or an explosion from combustible gas or natural gas liquids is present.

1.2 Scope

These potential hazardous areas include but are not limited to:

- Service rig operations
- Gas plants
- Pipelines, pump stations
- Oil batteries
- Natural gas liquids facilities
- Aircraft refueling operations
- Laboratories
- Wellheads
- Construction sites
- Drilling rig operations

Exceptions would be:

- construction that is grass roots (not on a live operating site),
- delivery and supply persons who will not be working on the site,
- when wearing a fully encapsulated suit such as for catalytic bead removal,
- visitors, where there is no potential for exposure to a hydrocarbon flash fire or an explosion from combustible gas or natural gas liquids is present at the site visited

For the purpose of this code of practice clothing is defined as the outer most garment and includes but is not limited to the following:

- coveralls
- winter bibs
- jackets
- rain wear
- hard hat liner
- face protection
- hoodies
- balaclava
- winter wear

Clothing made from acrylic, acetate, polyesters, nylon and polycotton blends are not allowed on live operating sites as they tend to melt or sustain flame when exposed to heat or fire.

1.2.1 Clothing Worn Underneath Fire Resistant Work Wear

Other material worn in conjunction with fire resistant workwear (e.g. clothing worn underneath) should not contribute to the injury of a worker in a hydrocarbon flash fire situation.

While the outermost layer of work wear worn must be of fire resistant material clothing worn underneath shall be of a nonfusible type. That is, clothing that does not melt.

Examples of acceptable nonfusible materials that can be worn underneath fire resistant outerwear include:

- Cotton
- Linen
- Wool
- Kermel Viscose
- Leather
- Nomex 3A ®
- Westex – FR/7A®
- INDURA® Ultra Soft® Knits or Fleece

1.2.2 Hoodies

Hoodies are permitted to be worn underneath FR coveralls under the following conditions:

- The hoodies are made of fire resistant material
- The strings have been removed
- The hood must be tear away
- The hood may be worn over the hard hat, when not in use the hood must be tucked in under the coveralls or coat

Hoodies may also be worn as an outer layer under the following conditions:

- The conditions noted above and,
- Hoodies must have retro reflective stripping

1.3 Purpose

We understand that garments can vary in sizing structure and detail from one garment manufacturer to another. To achieve standardization the code of practice will outline garment details and specify garment tolerances along with best laundry practices to ensure a consistent FR clothing program.

1.4 Protection *from Hydrocarbon Flash Fire (FR clothing)*

Harvest recognizes two standards for evaluation of Flame resistant fabrics for protection against hydrocarbon flash fire. NFPA 2112 (Standard on flame resistant Garments for protection of industrial personnel against flash fire) & CGSB 155.20 (Work wear for protection against hydrocarbon flash fire).

Harvest also recognizes industry leaders in flame resistant fabrics and prefers the industry proven and engineered fabrics of INDURA® Ultra Soft® and NOMEX 3A® and as such will require compliance of these fabric standards of Harvest employees and contract operators. Any future fabric substitution of other FR cotton substitutes, generics, FR Synthetics, or same as brand names must first be reviewed by Harvest Operations Corp. for performance in a detailed manner for flame resistance consistency, ASTM F1959 and NFPA 2112, CGSB 155.20 third party testing, and analyzed for consistency in color fastness and shrinkage control before being listed as an alternative. Harvest EH&S reserves the right to approve suppliers as per a pre-qualification evaluation to ensure the supplier is in fact supplying materials in accordance with the fabric standards.

All garment repairs must be made with similar or like FR materials or addition in flame resistant fabrics.

1.5 Background – *Protection from Electrical Arc:*

This Harvest's clothing specification is for coveralls for workers exposed to energized electrical components and circuits as a normal part of their responsibilities at all Harvest sites. Harvest will provide employees with protection from arc-flash hazards that may exist at their work location. This fabric specification provides guidance for protecting employees from electrical arc flash hazards through the use of FR clothing.

1.6 Specification *(Electrical and Hot Fluid/Steam Protection)*

The following details are for the supply of:

- INDURA® UltraSoft® flame resistant garments
- NOMEX 3A® flame resistant garments
- Style 452 INDURA® UltraSoft® flame resistant garments for exposure to hot fluids and steam
    - Note: Harvest recognizes that other materials meeting the criteria for hot fluids and steam are available and may be used with the Supervisor's approval.

These garment details are to ensure success of our Flame resistant clothing program.

All flame resistant garments must meet ASTM F-1506, and bear an interior label stating 1506 approval and the arc rating of the garment. FR (flame resistant) clothing approved for use by Harvest employees and contract operators must be made from INDURA® Ultra Soft® or NOMEX 3A®, with a minimum incident energy rating of 8.7 cal/cm². This meets the protective requirements of NFPA 70E HRC 0, 1, & 2 ***in a single layer of material***. This specification is to ensure that the fabric used by Harvest employees has been tested and proven to meet or exceed the level of protection needed for HRC 2 areas. Style 452 INDURA® UltraSoft® uses fabric with encapsulated technology providing the garment with protection from exposure to hot fluids and steam.

1.6.1 Coverall Retro reflective Trim:

High visibility safety vests must be worn when working with traffic or around multiple vehicles or mobile equipment.

A worker whose duties on the work site result in exposure to the hazards of mobile equipment must wear high visibility apparel meeting at least the Type 3 criteria of http://www2.wor

ksafebc.com/Publications/OHSRegulation/Part8.asp#SectionNumber:8.24

1.6.2 Proposed garment design: Class 1 coverall (2”trim)

Coverall trim placement:

- Single horizontal stripe around torso and limbs.
- Double vertical stripes on chest, cross on back.

Type 3 Garments:

- The garment background must be fluorescent lime yellow, fluorescent yellow or fluorescent orange colored.
- The minimum background area for either the front or the back of the garment is 0.064 square meters (100 square inches).
- The minimum vertical length for both front and back of the garment is 0.51 meters (20 inches).
- The fluorescent portion of the VE trim for either the front or the back of the garment must have a minimum area of 0.064 square meters (100 square inches).
- The garment must be designed so that there is color contrast along the entire length of at least one side of the VE trim.

VE Trim: Visibility enhancing trim attached to the garment. The trim has fluorescent and retro-reflective properties.

Coverall Front View Coverall Back View

1.6.3 Other Garment Details

- Lay flat collar or safety collar with Velcro closure.
- Logo should include employer and employee's name
- Mesh chest pocket for personal monitor

Note: Garment snaps, enclosures, zippers are to be covered with FR material so as not to attract electrical arc and to not contact the skin of the wearer.

For high HRC (hazard risk category) areas, such as Class 3 or 4, on Harvest worksites, additional outerwear (flash suits) rated for the known flash hazards will be required.

1.7 Garment *Labeling in Accordance with ASTM F1506-02ae1*

(Standard Performance Specifications for flame resistant textile materials, for use by electrical workers exposed to momentary electric arc and related thermal hazards.)

To aid in verification that properly rated FR clothing is being worn, the Harvest FR clothing specification requires external labels on all garments to indicate that the clothing is made of INDURA ®Ultra Soft® or NOMEX 3A®. The INDURA® Ultra Soft® FR or NOMEX 3A® tags on all coveralls should be seen from a distance without interrupting work when a supervisor conducts a visual inspection.

The garment label will need the following items listed:

- Name, trade mark or other means of identification of the manufacturer or authorized representative
- Designation of the product type, commercial name or code;
- Size designation;
- Description of the FR textile comprising the background fabric
- Meets requirements of Performance Specification 1506
- Tracking identification Code System
- An indication of FR performance, i.e. ATPV Rating, HRC 2
- Compliance to High Visibility Standard, CSA Z96-02

1.7.1 External Garment Labeling

Harvest coveralls to be labeled for HRC 2 and INDURA® Ultra Soft® FR or NOMEX 3A® label.

Example:

1.8 Laundry *details and FRC Care:*

Laundry details should be attached on the garment hang tag or label that is affixed inside garment. The cleaning guide must be followed as supplied by manufacturer.

Garments shall be clean and proper fitting and employees must have a spare set of work garments to change into if the first set becomes contaminated.

The flame resistance of the INDURA® Ultra soft® or NOMEX 3A® FR fabric is guaranteed for the life span of the garment, provided the manufacturer's laundry recommendations are followed.

Industrial laundries must adhere to the fabric manufacturer's laundry guide in order to maintain the garment life.

Garment cleanliness is of extreme importance as any contamination of the fabric will increase flammability i.e. grease, oil residues & hydrocarbons

In order to perform its protective function, a garment must be maintained in good condition. Rips, tears and abrasions to the fabric are normal consequences of use and they should be repaired as soon as possible with similar FR materials.

1.8.1 Wash & Dry Temperatures:

Wash and Dry temperatures can affect any FR fabric. To minimize shrinkage, Industrial laundries must adhere to the fabric manufacturer's guidelines on recommended temperatures for settings for Washing and Drying.

1.8.2 Wash Temperature/Garment Colorfastness

Wash heavily soiled garments using hot water temperature settings. The higher the temperature, the better the cleaning for heavily soiled garments.

Garments with lesser degrees of soil can be laundered with lower water temperatures, which also will be beneficial in retaining garment color. Wash Temperatures higher that 74 degrees Celsius may affect the wash fastness (color loss) of certain colors.

1.8.3 Other Laundry Products: Softeners or Starch

Laundry products such as fabric softeners and hand builders (Starch) present a complex situation relative to use with all flame resistant garments. We recommend against the use of these products except unique circumstances that are specifically described to us and that are tested for impact on flame resistance.

1.8.4 Chlorine Bleach

Review of various laundry advisories generally recommends against the use of chlorine bleach for protective fabrics of any fiber composition.

APPENDIX - A FRC (Fire Retardant Clothing)

Harvest will provide the following items of FRC Clothing:

- INDURA® UltraSoft® or NOMEX 3A® coverall(s)
- INDURA® UltraSoft® or NOMEX 3A® Bomber style jacket
- Insulated INDURA® UltraSoft® or NOMEX 3A® Winter Parka/ Bomber style jacket/Insulated Bibs
- CSA Approved Hard Hat Liners/Balaclava

Note: The number of FRC items required and replacement thereof will be determined on an as needed basis and must be approved by area foreman or direct supervisor.

Occupational Heath Concern	Applicable Standards	Frequency	OH&S Legislation	Service Provider (In-house or 3rd Party?)	Location of Records
Benzene Testing & Monitoring	No CSA Standard. Refer to the relevant OH&S Legislation.	As necessary to ensure the OEL is not exceeded e.g. prior to vessel entry	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 4 Chemical Hazards, Biological Hazards and Harmful Substances Schedule 1 Table 2 BC OH&S Part 5 SK OH&S Part XXI	In-house or 3rd Party	HSE & Local
NORM's Testing & Monitoring	No CSA Standard. Refer to the relevant OH&S Legislation.	AB, SK. As required to determine levels. BC: at the times required by the Safety Code or regulations, as the case requires. (b) if equipment has been damaged or modified	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 20 Radiation Exposure BC OH&S Part 7 SK OH&S Part VI	In-house or 3rd Party	HSE & Local
Audiometric Testing (Ongoing Requirement)	No CSA Standard. Refer to the relevant OH&S Legislation.	**AB:** Initial w/ 6 months, then 12 months after baseline, then every 24 months **SK:** Once very 24 months **BC:** Once every 12 months	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 16 Noise Exposure BC OH&S Part 7 SK OH&S Part VIII	3rd Party	Medical office. HSE & local should receive test lists only. Medical records should not be kept in employee files.
Hearing Conservation Program and Training	No CSA Standard. Refer to the relevant OH&S Legislation.	**AB:** If noise survey indicates workers are exposed, a plan must be developed. **SK**: Where 10 or more workers are exposed, a plan must be developed. Workers must be trained in the plan. The plan must be reviewed and where necessary revised every 3 years. **BC:** Required when the noise levels exceed 80 dBA. Must be reviewed yearly.	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 16 Noise Exposure BC OH&S Part 7 SK OH&S Part VIII	3rd Party	HSE & Local

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Occupational Heath Concern	Applicable Standards	Frequency	OH&S Legislation	Service Provider (In-house or 3rd Party?)	Location of Records
Facilities Noise Survey	**Z.107.53** : Procedure for Performing a Survey of Sound Due to Industrial, Institutional or Commercial Activities (Prescribes how noise levels are to be taken) The measurements are to be conducted with: • A sound level meter meeting the requirements for a "Type 2" instrument as specified by American National Standards Institute (ANSI) Standard S1.4-1983 (R1997) Specification for Sound Level Meters; • An integrating sound level meter (Type 1) meeting the requirements as specified by American National Standards Institute (ANSI) S1.41983 (R1997) Specification for Sound Level Meters or International Electrotechnical Commission IEC 804; Integrating-Averaging Sound Level Meters. The standard also prescribes how the testing must be done and how it is required to be reported.	**AB:** Review every 3 years, or when new equipment or process is introduced. Worker noise exposure assessments are required where noise levels exceed 85 dBA Lex **SK:** Areas where noise levels may or do exceed 80 dBA. Review every 3 years. Must be done if new equipment or process is introduced. **BC:** Initial noise survey is done in all areas to determine if levels exceed 82 dBA. If levels are below 82: no further action. If noise levels are above 85: a more detailed survey is required that includes worker noise exposure assessment. The noise survey and noise exposure assessments should be reviewed every three years. Additional testing is required when new equipment or process is introduced.	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 16 Noise Exposure BC OH&S Part 7 SK OH&S Part VIII	3rd Party	HSE & Local
Medical Fitness to Wear a Respirator Screening	**CSA Standard requires the medical fitness to be assessed prior to respirator use.** **AB:** The employer should ensure that a review of the fitness to wear a respirator is included at the time of fit testing to ensure that the respiratory protective equipment and medical status have not changed since the initial evaluation. **Sk:** As per the CSA standard: review fitness with each fit test. **BC**: As per the CSA Standard. Review fitness with each fit test	Reviewed Every 2 Years coinciding with Fit Test	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 18 Personal Protective Equipment/RPE BC OH&S Part 8 SK OH&S Part VII CSA Standard	3rd Party	Medical Provider for any that have a medical issues. It is also an occupational health best practice that spirometry testing be part of the fitness screening to rule out any underlying respiratory disease. These records to be kept by a medical professional.

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Occupational Heath Concern	Applicable Standards	Frequency	OH&S Legislation	Service Provider (In-house or 3rd Party?)	Location of Records
Respiratory Fit Test (Ongoing Requirement)	CSA Standard Z94.4 prescribes fit testing every year and the requirement to assess medical fitness to wear a respirator prior to fit testing. The standard defines that this must be done by a physician or registered nurse who is well versed in occupational health. Occupational health best practice also recommends that lung function testing be performed as part of the fitness to wear a respirator medical to ensure lung function is adequate.	Fit tests must be performed in accordance with procedures in CSA Standard CAN/CSA-Z94.4-02, Selection, Use, and Care of Respirators. a) Prior to initial use b) at least once per year c) whenever there is a change in respirator facepiece, including the brand, model, and size, and d) whenever changes to the user's physical condition could affect the respirator fit.	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 18 Personal Protective Equipment/RPE BC OH&S Part 8 SK OH&S Part VII CSA Standard	3rd Party	HSE & Local
Asbestos Identification & Management	No CSA Standard. Refer to the relevant OH&S Legislation.	As necessary	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 4 Chemical Hazards, Biological Hazards and Harmful Substances Schedule 1 Table 2 BC OH&S Part 5 SK OH&S Part XXIII	In-house or 3rd Party	HSE & Local
Mold & mildew Identification & Management	No CSA Standard. Refer to the relevant OH&S Legislation.	As necessary	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 4 Chemical Hazards, Biological Hazards and Harmful Substances Schedule 1 Table 2 BC OH&S Part 5 SK OH&S Part VI	In-house or 3rd Party	HSE & Local
SCBA Practical Review & don & doff	No CSA Standard. Refer to the relevant OH&S Legislation.	2 Times per year	AB OH&S Part 2 Hazard Assessment, Elimination & Control Part 18 Personal Protective Equipment/RPE BC OH&S Part 8 SK OH&S Part VII Section 88	In-house or 3rd Party	HSE & Local

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OFF LEASE MONITORING & CONTROL

4.0 OFF LEASE MONITORING & CONTROL

4.1 Purpose

The purpose of this guideline is to provide field operations personnel with information on how to safely conduct, monitor for and control all off lease odors. This is a generic guideline and workers are reminded that each location has different operating parameters and controls and therefore workers must conduct a site specific hazard assessment and apply this guideline to the results of that assessment.

4.2 Daily Activities

As part of their daily routine, operators are required to practice constant vigilance for ANY unusual occurrences or situations in their area of responsibility.

- Operators are required to perform and document daily odor checks around the perimeter of their facility
- Odor checks can be conducted by the use of electronic detection equipment and sense of smell.
- These checks must be documented in their daily log books and then recorded in the daily PVR comments
- The checks must include but are not limited to:
    - VRU's
    - low pressure flare systems
    - thief hatches
    - pop tank PSV's
    - flare stack arrestors and ignition systems
    - Valve packing
    - Dehydrators
- If odors are detected, the operator must take immediate actions to control the odors when safe to do so.
- If the issue can not be quickly corrected, the source must be immediately shut in and arrangements made to rectify the issue before resuming operations or introducing product back into the equipment

4.3 Routine Maintenance & Turnarounds

During routine maintenance or Turnaround activities where piping, tanks, or vessels will be opened and there is a risk of an H2S release that may cause off lease odors the following procedure must be considered.

- It may be necessary to purge the tank, flow line, and vessels to lower the H2S levels prior to the use of an H2S scrubber
- Vacuum trucks pulling pressure and fluid containing H2S must be vented through a scrubber unit to remove the H2S from the vent gas or if practical tied into an enclosed recovery system
- When tanks and vessels are being prepared for cleaning, entrance, and inspection; H2S scavenger chemical must be introduced first to eliminate the majority of the H2S and LEL in the piece of equipment to be entered, and where possible, prior to the man-ways being opened
- An H2S scrubber unit or an enclosed recovery system must be used until all H2S levels have been eliminated from the equipment in question

Once an off-site odor issue has been identified and it is safe to do so, appropriate notifications must be made in the way of self-disclosure to the Provincial Regulators. These notifications must be followed up with the completion of an Incident Report. Refer to Directive 60 Section 8.2(3).

VEHICLE RECOVERY & TOWING

5.0 VEHICLE RECOVERY & TOWING

5.1 Purpose

This Vehicle Recovery & Towing Safe Work Guideline has been developed to provide light and medium duty vehicle operators at Harvest Operations Corp. (HOC) with a set of best practices to follow to avoid injury and damage while attempting to tow and/or recover stuck vehicles.

By providing this Guideline, HOC hopes to increase awareness of safety issues and to promote the safe usage of vehicles by personnel throughout the organization.

This guideline is based on the Enform best practices Vehicle Recovery and Towing Guideline and is intended to establish the minimum standards of practice for vehicle recovery and towing.

5.2 Audience

This guideline has been developed for use by anyone operating a light or medium duty vehicle for HOC whether employee or contract operator. This document is intended to be used as a guide only and is not all inclusive. The Guideline herein sets out in general principal the actions necessary when conducting basic vehicle recovery operations.

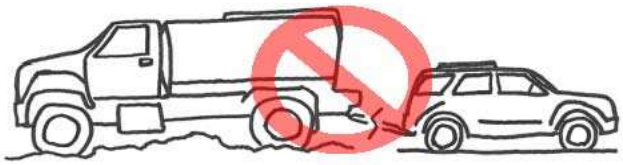
5.3 Scope & Limitations

The information in this guideline is for the recovery and towing of light to medium duty vehicles only.

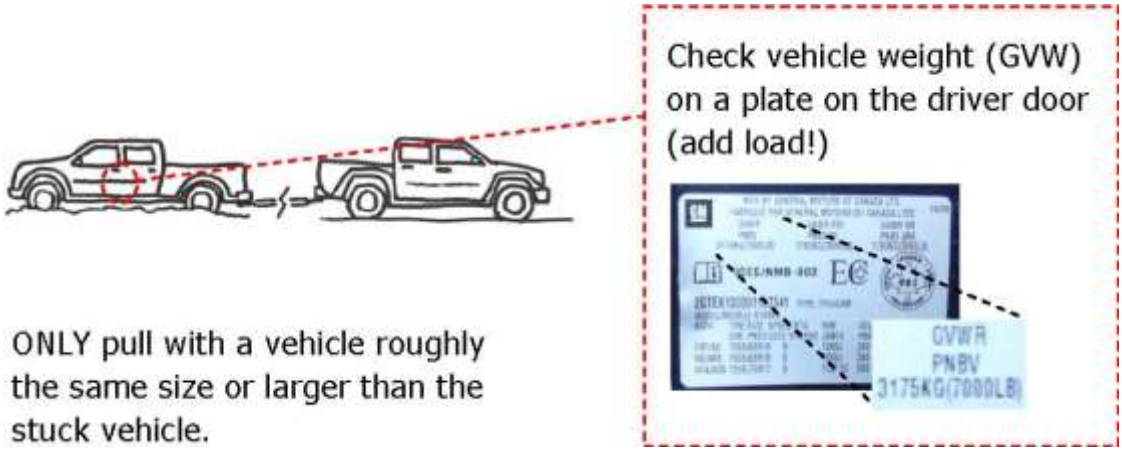
5.4 Key Principles

The most preferred option is to call a recovery vehicle. However that option may not always be practical or available so if you are attempting to recover and two a vehicle, there are several key considerations that must be respected at all times.

DO NOT use a lighter/smaller vehicle to pull out a heavier/larger one



ONLY attempt to recover a vehicle with a vehicle of similar or larger size

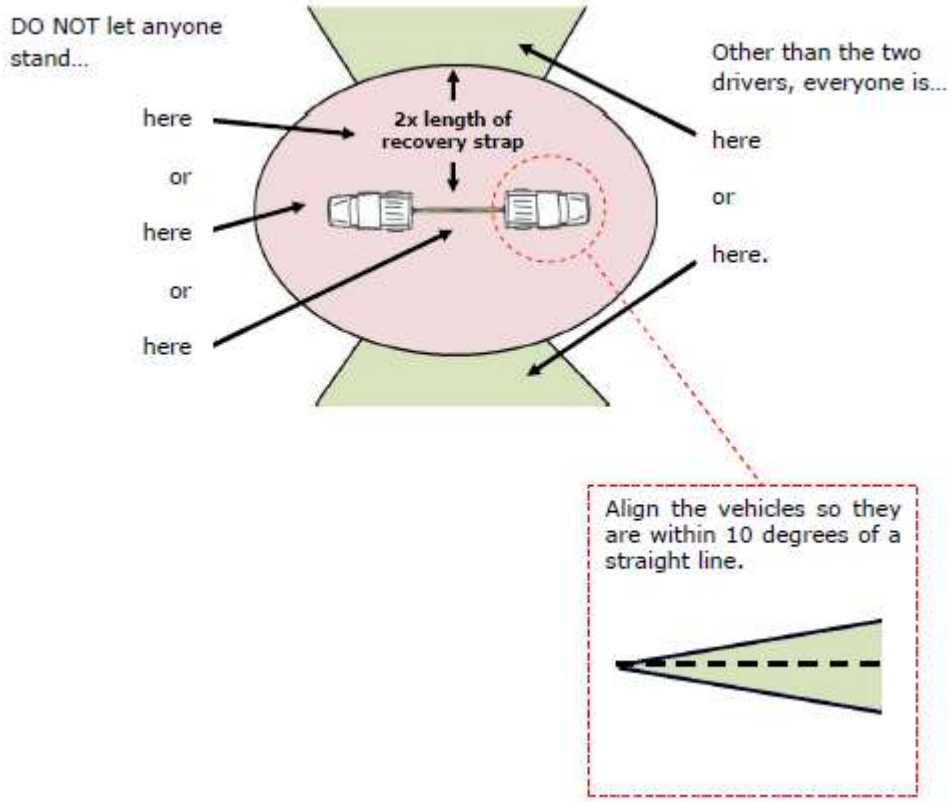


DO NOT use chains, cables or web lifting slings. These can become deadly projectiles if they fail.

ONLY use a Recovery Strap with correct loops. Minimum Breaking Strength (MBS) should be 2-3 times greater than the vehicle weight.

DO NOT attach to bumpers, ball hitches, bull bars or front tie down eyelets. These can tear free under towing stress.

Frame mounted receivers must be rated to the equivalent weight of the Shackle and Recovery Strap being used


DO NOT let anyone stand...
here
or
here
or
here
2x length of recovery strap
Other than the two drivers, everyone is...
here
or
here.
Align the vehicles so they are within 10 degrees of a straight line.

5.5 Procedures

STEP BY STEP GUIDE FOR PULLING OUT A VEHICLE WITH A RECOVERY STRAP

1. Stop, consider the task at hand and assess the hazards:

   - If you have any questions or doubts at this point, call a recovery vehicle, it remains your best option.
   - Use the checklist provided at the end of this document to make a safe decision.

2. If the vehicle recovery takes place on or near a roadway, you must implement a traffic warning or traffic control system (e.g., traffic cones or reflector flares).

3. Ensure that you have the correct equipment—a recovery strap is essential.

   - The recovery strap should be at least 6 m or 20ft in length, with loops (not hooks) and in good working condition (no cuts, tears, broken stitches, fraying etc.).
   - If you do not have a recovery strap like this at hand, call a recovery vehicle.

4. Check both vehicle weights and add the weights of any loads either vehicle is carrying.

   - The vehicle doing the pulling must be of equal or, ideally, greater weight than the vehicle that is being pulled.

5. Ensure the recovery strap has a Minimum Breaking Strength (MBS) that is 2-3 times the total weight of the stuck vehicle.

   - If it is less, the danger is the strap may snap under high tension.
   - If the MBS is much greater than the stuck vehicle, it will not function optimally (they are most effective when their elasticity enhances the pull).
   - Recovery straps are usually constructed so that each inch of width adds approximately 10,000lbs (4,500 kg) of MBS (e.g., a 3 inch wide strap would usually have a rating of approximately 30,000lbs [13,500 kg]).

6. Ensure tow hooks, hitch receivers and any shackles used are rated to loads that exceed the recovery strap MBS. In the event of excessive loads, the recovery strap should always be the weakest link and snap first.

7. As much as possible, clear out mud, sand, or snow from under the stuck vehicle and in front of the tires in the direction of the pull.

8. Position the pulling vehicle in line with the stuck vehicle—the pulling vehicle facing

forward; the stuck vehicle being pulled from the front (ideally) or the back.

- You need to be within 10° of a straight line—side loading can lead to serious vehicle damage.
- You need to be sure you have a clear path straight forward free of any obstacles that is at least the length of the strap and stuck vehicle.

9. Lay out the recovery strap between the two vehicles and loop the strap onto a tow hook bolted to the vehicle frame or put the loop on a shackle which is properly pinned to a frame mounted hitch rated for recovery.

- If using a threaded shackle, hand-tighten the pin and then turn it back one quarter turn for ease of release later.
- Never tie the strap onto the vehicle, slip the strap over a ball hitch, or attach it to anything other than a tow hook or frame mounted hitch.
- Only use one recovery strap (never two in parallel)—however, there are two options for creating additional length with two recovery straps if needed:

Double length by threading straps through each other's eye. A rolled newspaper stuck between the loops provides a safe means of undoing the knot later.

Gain 50% more length by looping one strap through the eye of another.

Never use a shackle to join two straps—if a strap fails, it becomes a deadly projectile.

- Reduce the expected strength of the recovery straps by 25

10. Drape a heavy coat or blanket over the middle of the strap to dampen any backlash if it does fail or releases

11. Agree on a plan and communication signals between the two drivers. Industry Recommended Practices Hand Signals for Directing Vehicles (IRP12) provides a good system of hand signals to use.

12. Ensure all other bystanders are at least 2 times the length of the recovery strap to the SIDE of the vehicles – both the strap and the vehicles suddenly lurching forward present serious hazards.

13. The pulling vehicle accelerates slowly (to about 10 -12 Km/hr) to build tension in the strap and provide a sustained pull. Once the slack is taken up, the stuck vehicle likewise applies acceleration in low gear to assist the pulling vehicle. Neither vehicle should be spinning their wheels.

    - Steady momentum is most effective – never resort to jerking or backing up and taking a long run and jerk.
    - Maintain tension throughout the pull; do not allow any slack to develop in the strap.
    - If after three attempts to extricate the vehicle you are unsuccessful, it is time to stop and call for additional resources.

14. Do not attempt to remove strap and connections until both vehicles are fully stopped and secured.

    - Follow the manufacturer's instruction in regard to cleaning and maintaining the recovery tow strap after use

Remember, if at any point in the process you have any safety concerns whatsoever or concerns about potential damage to vehicle, stop and call a recovery vehicle.

Pre-Job checklist to be completed when using Vehicle Recovery Strap to extricate or tow a vehicle. A "no" marked in any of the boxes requires the user to either mitigate the hazard and if not able to do so, a recovery vehicle service must be called in.

Do both parties involved have permission from their respective companies to perform a vehicle recovery?	Yes	No
Have you checked and considered the gross vehicle weight (including any loads) of both vehicles?	Yes	No
Is the total weight of the recovery vehicle equal to or greater than the total weight of the stuck vehicle?	Yes	No
Do you have a Recovery strap with a minimum Breaking Strength (MBS) that is 2 – 3 times greater than the total weight of the stuck vehicle?	Yes	No
Is the recovery strap in good working condition (e.g. no visible tears, fraying or other damage)?	Yes	No
Do you have the appropriate and adequate attachment points on both vehicles?	Yes	No
If using any kind of shackle, does it have a Working Load Limit (WLL) that is greater than that of the recovery strap?	Yes	No
Do you have a heavy coat or blanket to lie over the middle of the recovery strap during the operation?	Yes	No
Can you align the recovery vehicle with the stuck vehicle to allow for a straight pull?	Yes	No
Is the intended towing/extraction route clear of any debris, obstacles or other hazards (e.g. trees, stumps, rocks etc.)?	Yes	No
Have you set up the necessary traffic control system to mitigate the hazards from other road users?	Yes	No
Have you established and agreed upon clear communication signals between the two drivers involved in the tow/extraction?	Yes	No
Are both drivers clear and fully aware of the correct procedure for the recovery attempt?	Yes	No
Have you clearly communicated the dangers and established a safe perimeter of at least 2 times the distance of the recovery strap for any bystanders?	Yes	No
Do both drivers understand that after three failed attempts to recover the vehicle, a recovery vehicle service must be called in?	Yes	No
Do both drivers understand the hazards of a recovery attempt, especially the extreme danger to all parties should any of the components fail?	Yes	No
Have you taken the time to consider all potential hazards presented by the current situation?	Yes	No
Are you confident that you have taken sufficient measures to assess all of the risks and to mitigate those hazards to an acceptable level?	Yes	No

Always remember, a certified recovery vehicle is always your best option.

5.6 Additional Important Information

Vehicle recovery, apart from the use of a licensed recovery vehicle and operator, exposes our workers and the company as a whole to a certain level of risk and as part of our due diligence, we must consider the level of risk we are going to tolerate when developing and implementing a guideline.

A rule of thumb when assessing risk is to achieve A.L.A.R.P “as low as reasonably practical” Simply put, if you have identified a hazard and determined that there is a risk of people being injured, equipment damaged or any other loss, you must reduce the risk to a level that will prevent these from happening. If you cannot, then stop what you are doing and in this case, call a recovery vehicle service.

The steps, methods and information provided in this guideline are exactly that, guidelines. The guideline has been created with the intention of preventing the most common mistakes individuals make when attempting a recovery and to make them aware of some of the hazards that do and can potentially exist.

1. This vehicle recovery guideline is designed based on the assumption that the stuck vehicle is capable of assisting with the recovery and will be fully capable of driving once pulled out. Therefore, if the stuck vehicle is incapacitated, it should remain where it is and a recovery vehicle service called.

2. Steep terrain provides additional hazards including the danger of the recovering vehicle losing traction and sliding downhill as well as the increased load created when pulling a vehicle uphill. Heavy mud and packed snow would also increase the load. You must take these factors into consideration when considering attempting a recovery.

3. Recovery straps degrade with repeated use (and particularly repeated use without an interval to allow the strap to recover from being stretched) or if they are allowed to remain dirty. Refer to the strap manufacturer’s instructions in regard to cleaning, storing and inspecting a recovery strap.

WORKPLACE VIOLENCE

6.0 WORKPLACE VIOLENCE

6.1 Introduction

Harvest Operations Corp. (HOC) recognizes that workplace violence can seriously compromise a work environment. HOC is committed to providing a working environment where all employees can work with mutual respect and without fear of threatening and disruptive behaviours. Any act of violence committed by or against any member of our workplace or member of the public is unacceptable conduct that will not be tolerated.

Workplace violence can come from anyone in the workplace and be directed at anyone. Workplace violence can victimize both men and women and may be directed by or towards workers, clients and members of the public.

Workplace violence is any act in which a person is abused, intimidated or assaulted and includes:

- Physical attacks or assaults such as hitting, shoving, pushing, kicking.
- Threatening behaviour such as shaking fists or throwing objects.
- All violence directed towards company property (e.g. sabotage, and arson).

6.2 Provincial Definitions of Workplace Violence

6.2.1 Alberta

Violence, whether at a work site or work related, means the threatened, attempted or actual conduct of a person that causes or is likely to cause physical injury.

6.2.2 British Columbia

Violence, means the attempted or actual exercise by a person, other than a worker, of any physical force so as to cause injury to a worker, and includes any threatening statement or behaviour which gives a worker reasonable cause to believe that he or she is at risk of injury.

6.2.3 Saskatchewan

Violence, means the attempted, threatened or actual conduct of a person that causes or is likely to cause injury, and includes any threatening statement or behaviour that gives a worker reasonable cause to believe that the worker is at risk of injury.

6.3 Roles and Responsibilities

6.3.1 Superintendents, Field Foremen, and Lead Operators

a) Ensuring the Workplace Violence Safe Work Guideline is implemented, reviewed with employees and followed at all HOC facilities and locations in their area of responsibility and under their supervision.
b) Investigating reported incidents of violence in a confidential, objective and timely manner in accordance with HOC's Incident Reporting and Investigation requirements (Refer to the Incident Reporting and Investigation section)
c) Taking necessary action to prevent reoccurrence; which may include;

i. Report the incident to HOC's Human Resources for guidance and assistance with:
- Providing appropriate support for victims.
- Worker discipline and performance management.

6.3.2 Workers and Contractors and/or Designated Alternates

a) Complying with this Workplace Violence Safe Work Guideline.
b) Supporting management's commitment to preventing violence in the workplace and that a zero tolerance towards violence will be followed.
c) Treating co-workers, consultants, vendors, clients and the public with dignity and respect.
d) Reporting to the Field Foreman or Work Site Supervisor any potential violence or act of violence that is occurring or may occur at the work site.

6.4 Instruction of Workers

a) Employees will receive instruction and guidance on Harvest's policies and guidelines on workplace violence at the time of hiring and/or during their orientation.
b) Instructions that focus on workplace violence (guidelines) and the employer's policy should be part of any orientation program. Topics covered:

- The means to recognize potentially violent situations
- Procedures, work practices, administrative arrangements and engineering controls that have been developed to minimize or eliminate the risk to workers
- The appropriate responses of workers to incidents of violence, including how to obtain assistance
- Procedures for reporting violent incidents.

c) Printed information regarding the company's policy and procedures on workplace violence will be distributed to all new hires

6.5 Horseplay and/or Practical Jokes

A precursor to potential workplace violence could manifest in the form of horseplay and/or practical jokes. This type of behaviour will not be tolerated on any HOC facility or work site location and everyone shares a responsibility to see that it does not occur (Refer to the EHSMS, General Safety Rules).

6.6 Risk Assessment and Preventative Measures

When considering the hazards associated with violence in the workplace consider the following preventative measures:

a) Communicate HOC's commitment towards the prevention of workplace violence
b) Identify potential areas in the organization where workplace violence can occur or has occurred
c) Implement measures to reduce the risk to employees
d) Seek input and feedback from employees as to the risks they perceive on the job as it relates to workplace violence
e) Where practical, ensure the workplace is kept secure by controlling access to Harvest facilities and work locations
f) Ensure identification is requested from any unauthorized person on any company property

6.7 Responding to Workplace Violence Incidents

If it becomes necessary to remove unauthorized individuals from the site assess the situation and take the appropriate measures:

- Ensure your personal safety first
- Inform the person or persons they have to leave the site and escort them from the site.
- If the person or persons refuse to leave do not attempt to remove them on your own, notify the authorities for assistance (e.g., RCMP, local authorities)
- Report and investigate the incident in accordance with Harvest's Incident Reporting and Investigation requirements
- If it becomes necessary to remove or separate workers that have been involved in a work place violence incident:
- Ensure your personal safety first
- Call out for assistance if available
- Instruct the individuals to separate
- If the individuals refuse to disengage from the confrontation remove yourself and contact the authorities for assistance (e.g., RCMP, local authorities)
- Escort the individuals to separate locations with instructions to remain in place until notified
- Contact your Supervisor

- Incidents involving third party personnel will be managed via their employer's work place violence policies and procedures
- If they are HOC employees contact Human Resources for further instructions; after hours calls can be directed to the 24 hour Employee Assistance Provider: Call 1-800-663-1142.
- Report and investigate the incident in accordance with HOC Incident Reporting and Investigation requirements:
    - Report the nature, date, and the time of the violent incident, any witnesses, any other persons being treated in a similar manner, and the offender.

6.8 Disciplinary Action

Workplace violence incidents that involve HOC employees will be managed in accordance with the HOC Disciplinary Policy.

6.9 Victim Support for Harvest Employees

Victims or those affected by workplace violence will be provided with a debriefing and any necessary company assistance through HOC's Human Resources Department.

6.10 Regulations and References

1. **Alberta** Occupational Health and Safety Code (2009), Part 27, Violence

Workplace Alberta, *Preventing Violence and Harassment at the Workplace (2006)*

2. **British Columbia** OH&S Regulation (to 2011): Part 4, Workplace Conduct

Work Safe British Columbia, *Violence in the Workplace (2006)*

3. **Saskatchewan** OHS Regulation (to 2009), Part 37, Violence

Work Safe Saskatchewan**,** *A Guide to Developing a Violence Policy (2010)*

CRITICAL TASK LIST

3.6 CRITICAL TASK LIST

*Forms currently under development.

ORIENTATIONS & TRAINING

4.0 ORIENTATIONS & TRAINING

4.1 Policy

All Harvest Operations Corp. (Harvest) personnel and representatives are required to be orientated and trained to effectively manage risk per their job function.

4.2 Introduction

Training is an important part of the overall Harvest Environment, Health & Safety Management System (EHSMS). Training, experience and required qualifications ensures that workers have the necessary job skills to conduct work safely.

Harvest is committed to ensuring that all new or transferred employees have the necessary training to perform their tasks safely. This training may be carried out internally and may include safety, technical or vocational training.

Supervisors and workers are responsible for identifying training requirements and ensuring that they are met. Worksite supervisors are responsible for ensuring contractor and subcontractors conducting work at an Harvest worksite meet the Harvest training requirements. Contractors and sub-contractors are responsible for providing required training to their workers.

The type of training provided to a worker is to be consistent with the individual's assigned duties, risk exposure, equipment to be used, worker's previous experience, and the degree of supervision to be provided.

Worker training will generally be provided in the form of:

- orientations
- certifications
- on-the-job training
- mentoring
- workshops
- training/ presentations

Safety training will be provided according to the training matrix; Training Requirements as per Job Function.

4.3 Orientations

Harvest currently has 4 levels of Orientations. All required orientations must be completed before commencement of assigned duties.

Level 1: Introductory Safety Orientation

All new workers will receive and complete the Level 1: Introductory Safety Orientation. This is an introduction by the COO on Harvest EH&S Policy. This is available via ComplyWorks (www.complyworks.com).

Level 2: Enform – Electronic General Safety Orientation (eGSO)

All employees, contractors, and sub-contractors conducting work at an Harvest worksite must complete an Enform - eGSO prior to commencing work.

The Enform – eGSO is available online through Enform (www.enform.ca).

Note: The Harvest Field Safety Orientation can be used for temporary coverage for an individual that cannot provide proof of completing the Enform – eGSO. A Harvest Field Safety Orientation must be conducted by a competent Harvest representative. This orientation is only valid for the duration of the scope of work determined by the Worksite Supervisor. Copies of the Harvest Field Safety Orientation must be retained in the field office or project file for future reference.

Level 3: Site Specific Orientation & Hazard Assessment

All visitors and workers at Harvest sites must report to the appropriate Harvest authority and receive a Site Specific Orientation & Hazard Assessment. The Site Specific Orientation & Hazard Assessment is intended to communicate site hazards and rules. The Site Specific Orientation & Hazard Assessment will be conducted by a Harvest representative and will include:

- Description of facility and hazards
- Personal protective equipment requirements
- General rules (smoking, parking, cell phones, cameras, electronic devices, etc.)
- Emergency procedures and contacts
- Muster point and alarms

Upon completion of this orientation & hazard assessment, visitors and workers are required to record the time they entered the site on a Sign-in Sheet. When leaving the site visitors must record their check out time on the same sheet. The Sign-in Sheet may be used by Harvest to track and account for all individuals at the site during an emergency.

Level 4: Corporate EHSMS Orientation

The Level 4: Corporate EHSMS Orientation is an overview of the following elements:

- Section 1: Management Commitment & Responsibilities
- Section 2: Hazard Identification, Risk Assessment & Control
- Section 3: Policies, Codes of Practices, Rules, Procedures & Guidelines
- Section 4: Orientation & Training
- Section 5: Communication
- Section 6: Incident Reporting and Investigation
- Section 7: Environmental Management
- Section 8: Contractor Engagement
- Section 9: Emergency Response
- Section 10: Forms

This orientation must be completed every 3 years.

Corporate Office Visitor Orientation

All Visitors to the Corporate Office must complete and sign-off on the Corporate Office Visitor Orientation.

This orientation is available at the front reception and through contacting the EH&S group.

4.4 Certifications

Certification requirements are dependent upon the workers responsibilities, job description, specific work site hazards, experience, industry standards and regulatory requirements.

Workers are expected to carry copies of their certifications with them while on site. Hiring Leaders and Worksite Supervisors are responsible for ensuring certification requirements are met and are up to date for their workers. Worksite Supervisors should verify contractor and sub-contractors certifications through the work agreements system.

Note: For Safety Training Requirements (including Certificates) refer to the Training Requirements pre Job Functions.

4.5 On-The-Job Training

On-the-job training is provided as a means of ensuring that all new or transferred workers performing tasks are competent and capable of doing the work. It provides hands-on experience in proper work procedures for each job and it can be used as refresher training.
The process for conducting on-the-job training is as follows:

a) Each operating area shall compile a list of tasks deemed "critical" and prioritize through task analysis (risk assessment).
b) For each "critical" task, a Job Safety Analysis will be performed and an operating practice/procedure is to be developed. The procedure is to form the basis of the on-the-job training.
c) The person conducting the training is to be familiar with the worksite, the procedure and competent in the particular job for which they are providing training.
d) After the training has been provided, the trainee shall be checked / tested for competence and proficiency by the supervisor or alternate.
e) The supervisor or alternate shall record the fact that training was conducted, and the trainee proven competent to perform the job.

4.6 Mentoring

All workers should be evaluated as to whether they meet the position requirements. If there is a gap between the job requirements and the workers skill and knowledge level, arrangements must be made to provide appropriate supervision and mentoring until the deficiency can be remedied. Special attention should be given to new, inexperienced and summer students. Development of an appropriate mentoring program should include proper assessment of the workers experience and skill level and then careful consideration of who is qualified, available, and who will take the appropriate time and interest to ensure the new worker is well trained and qualified before left on their own.

4.7 Training Records

Training records are used to track current training and to plan future training needs. The following training records should be maintained by all workers:

- Certification Records (Records Management – ComplyWorks)
- On-The-Job Training Records (JSA’s, Technical Training – ComplyWorks)

Workers must carry and be able to produce their Certifications on request.

4.8 Training Requirements as per Job Function

COURSE	WHO NEEDS	LEGISLATED	INDUSTRY STANDARD	COMPANY STANDARD	COURSE RESOURCE	RECERT.
ORIENTATIONS:						
Corporate Emergency Response Plan	ALL	OH&S	YES	YES	Under Development	3 Years
Corporate Office Visitor	All Visitors to the Corporate Office	OH&S	YES	YES	Handout - Pamphlet	As Required
Fitness for Work Policy	ALL			YES	Online via ComplyWorks	Yearly
Hazard ID, Risk Assessment & Control	ALL	OH&S		YES	Online via ComplyWorks	Yearly
Level 1: Introductory Safety	ALL	OH&S	YES	YES	Online via ComplyWorks	Yearly
Level 2: Enform - EGSO	All visitors/ workers at HOC Field sites	OH&S	YES	YES	Online via Enform	none
Level 3: Site Specific Orientation & Hazard Assessment	All visitors/ workers at HOC Field sites	OH&S	YES	YES	On-Site	As Required
Level 4: Corporate EHSMS	ALL	OH&S	YES	YES	Online via ComplyWorks	3 Years
CODES OF PRACTICE TRAINING:						
Confined Space - Basic Level One	ALL	OH&S	YES	YES	Under Development	Yearly
Fire Safety and Prevention - Basic Level One	ALL	NFPA and OH&S	YES	YES	Under Development	Yearly
Ground Disturbance	All Employees, Hiring Leaders, and Worksite Supervisor involved with Ground Disturbance	OH&S	YES	YES	Online via ComplyWorks	Yearly
Safe Work Agreement	All Employees, Hiring Leaders, and Worksite Supervisor issuing Safe Work Agreements	OH&S	YES	YES	Online via ComplyWorks	Yearly
SAFE OPERATING PROCEDURES TRAINING						
Energy Isolation					Under Development	Yearly
Office Hazards & Controls		OH&S	YES	YES	Under Development	Yearly
Working At Heights	ALL	OH&S		YES	Under Development	Yearly
STANDARD CERTIFICATIONS:						
B.C. Workplace Emergency First Aid	All BC Workers	OH&S	YES	YES	2 day standard first aid and CPR (Red Cross or St. John's)	3 Years
Enform - H_2S Alive	ALL	AER AND OH&S	YES	YES	Enform endorsed H2S Alive course	3 Years
Quantitative Fit Test	All Workers working on H2S locations	OH&S	YES	YES	Third party testing service that provides industry approved certification	2 years
Standard First Aid / CPR	ALL	OH&S	YES	YES	2 day standard first aid and CPR (Red Cross or St. John's)	3 Years

TDG	ALL	TRANSPORT CANADA	YES	YES	Certification training in accordance with the Federally regulated TDG Act and Regulations (online or in class)	3 Years
WHMIS	ALL	OH&S	YES	YES	Proper use, handling, storage, and disposal of controlled products. (online or in-class)	3 Years
WHMIS 2015 GHS	ALL	OH&S	YES	YES	Third party training (online/ in-class) that incorporates the Global Harmonized System (GHS)	None
AWARENESS TRAINING						
Alberta OH&S	AB - Tier 4 Safety Committee members	OH&S	YES	YES	Online via ComplyWorks	3 Years
Alberta Wildfire Awareness	ALL	OH&S	YES	YES	On-Site	Yearly
Bear Safety	All Workers that work in known bear populated areas	OH&S	YES	YES	Online via ComplyWorks	3 Years
COROD - Video	All new operations & well servicing			YES	Online via ComplyWorks	None
Helicopter Passenger Safety Awareness	All Workers who use a Helicopter				Online via ComplyWorks	As Required
Safety Management and Regulatory Awareness for Well site Supervision	Well Servicing and Drilling Consultants/ Worksite Supervisors		YES	YES	Third party training service that provides industry approved certification training (franchised instructors from Enform)	3 Years
Wildfire Awareness	ALL	OH&S	YES	YES	Online via ComplyWorks	Yearly
OTHER TRAINING/ CERTIFICATIONS:						
ARGO Instructor Training	Select Workers who use ARGO's				Third party training service that provides industry recognized and certifiable operator theory and practical training.	As Required
ARGO Operator Training	All Workers who use ARGO's	OH&S	YES	YES	Third party training service that provides industry recognized and certifiable operator theory and practical training.	3 Years
ATV Instructor Training	Select Workers				Third party training service that provides industry recognized and certifiable operator theory and practical training.	As Required

ATV Operator Training	All Workers who use ATV's (e.g. quads)	OH&S	YES	YES	Third party training service that provides industry recognized and certifiable operator theory and practical training.	3 Years
BC Work Safe Joint Committee course	BC - Tier 4 Safety Committee members			YES	Refer to Work Safe Education Partners	None
Blow Out Prevention (Well Control)	Well Servicing and Completions Supervisors/ Superintendents	AER, BCOGC and SERM	YES	YES	Third party training service that provides industry approved certification training (franchised instructors from Enform)	5 Years
Boat Operator Training & Card	All workers who operate a motorized boat or amphibious vehicle (e.g. Argo)	TRANSPORT CANADA	NO	YES	Online training course that is endorsed by Transport Canada and is known as the “Pleasure Craft Operator Card”.	None
Confined Space Entry and Rescue Simulator	All workers that are issuing safe work agreement for confined space entry and/or supervising confined space entry work	OH&S	YES	YES	Third party training service that provides industry recognized and certifiable theory and practical training in Confined Space	3 Years
Defensive Driving	May be dictated by accident history			OPTIONAL	Third party training service that provide basic defensive driver training theory (off highway) combined with a driving test/evaluation (e.g. AMA collision avoidance, Global def. driver training)	None
Facilities Construction Supervisor Core Skills Assessment Review	All Facilities			YES	Online via ComplyWorks	Yearly
Fall Protection	All Workers who are directly involved in working at heights must have industry-approved certification in Fall Protection.	OH&S	YES	YES	Third party training service that provides industry approved certification training	3 Years
Fall Rescue	Rescue personnel must have industry-approved certification in Fall Rescue.	OH&S	YES	YES	Third party training service that provides industry approved certification training	3 Years

Fire Safety and Prevention Training - Basic Level Two	As designated by HOC Operations Managers/ Superintendents	NFPA and OH&S	YES	YES	Third party training services that provide basic fire safety and prevention training that is combined with practical fire extinguisher training.	3 Years
Fire Safety and Prevention Training - Advanced: Ignition plume training	As designated by HOC Operations Managers/ Superintendents	NFPA and OH&S	YES	YES	Third party training services that provide ignition plume training as recognized by industry.	3 Years
Multi Gas Clip Training	All Workers			YES	Online via ComplyWorks	As Required
Ground Disturbance Level 2 (Supervisor Level)	Ground disturbance is mandatory for those supervising a ground disturbance or those assigned as an alternate GD supervisor	YES	YES	YES	Third party training service that provides industry approved certification training	3 Years
MOC - Orientation	ALL			YES	Online via ComplyWorks	None
MOC - Video Training for Siteview	ALL			YES	Online via ComplyWorks	None
NORMs Training for Oil & Gas Workers	All personnel working with NORM's contaminated materials	OH&S	YES	YES	Third party training service that provides industry approved certification training	None
Sask OHS Joint Work Place Health and Safety Committee training program	Sask - Tier 4 Safety Committee members			YES		None
Safety Management and Regulatory Awareness for Well site Supervision	Well Servicing and Drilling Consultants/ Worksite Supervisors		YES	YES	Third party training service that provides industry approved certification training (franchised instructors from Enform)	3 Years
Second Line Supervisors Blow Out Prevention	Drilling Managers, Supervisors, Superintendents, and Consultants	AER, BC OGC AND SERM	YES	YES	Third party training service that provides industry approved certification training (franchised instructors from Enform)	2 Years
Snowmobile Instructor Training	Select Workers who use snowmobiles				Third party training service that provides industry recognized and certifiable operator theory and practical training.	As Required
Snowmobile Operator Training	All Workers who use Snowmobile's	OH&S	YES	YES	Third party training service that provides industry recognized and certifiable operator theory and practical training.	3 Years

UTV Instructor Training	Select Workers who use UTV's (e.g. side-by-sides)				Third party training service that provides industry recognized and certifiable operator theory and practical training.	As Required
UTV Operator Training	All Workers who use UTV's (e.g. side-by-sides)	OH&S	YES	YES	Third party training service that provides industry recognized and certifiable operator theory and practical training.	3 Years
Well Service B.O.P	Well Servicing and Completions Managers, Supervisors, Superintendents, and Consultants	AER, BC OGC and SERM	YES	YES	Third party training service that provides industry approved certification training (franchised instructors from Enform)	5 Years

COMMUNICATION

5.0 COMMUNICATION

5.1 Introduction

Effective communication is an instrumental component of the Environment, Health and Safety Management System (EHSMS). The more workers know about Harvest Operations Corp. (Harvest) EHSMS, the better able they will be to support it. Effective communication will result in greater participation in the development and implementation of the EHSMS and will lead to improved safety and environmental performance.

5.2 Management Communication

Management is responsible for monitoring the overall implementation and effectiveness of the EHSMS. Management will promote a high level of environment, health and safety excellence and encourage program involvement by communicating regularly with all workers and stakeholders. Management will utilize various communication methods (documentation, verbal, worksite tours, inspections, committees, safety meetings, etc.) to distribute information and receive valuable feedback from the workers. Feedback and input from workers is essential in determining how well policies, rules, standard work procedures and regulatory requirements are being understood.

All communication methods must be designed to provide an open and effective two-way communication system on all aspects of safety.

In order to promote the importance of environment, health and safety in the workplace, management will:

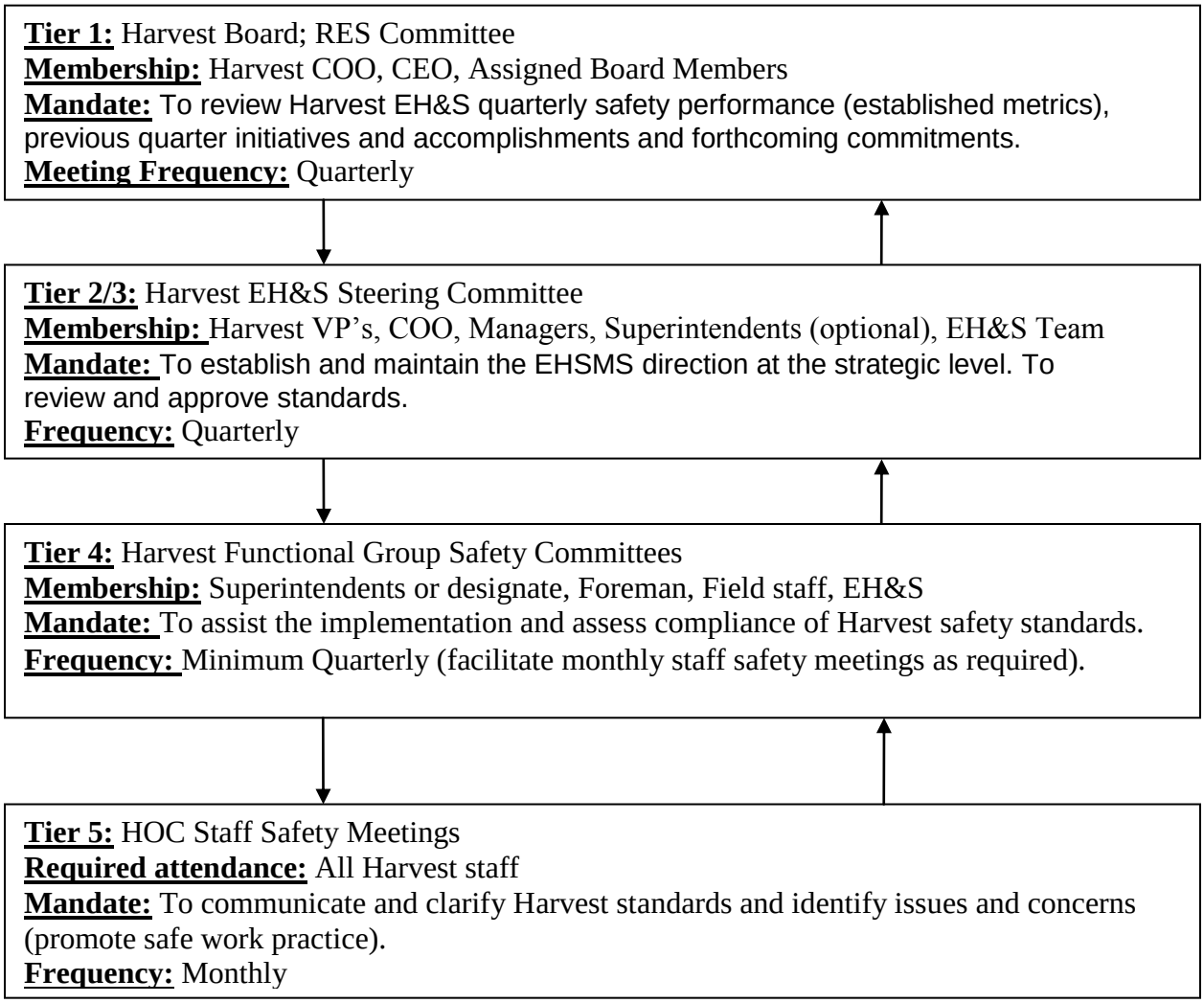
a) Review and evaluate the company's environment, health and safety performance.
b) Make recommendations for improvement to progress the company’s environment, health and safety performance.
c) Tour worksites to observe operations and encourage discussion of environment, health and safety issues.
d) Review all environment, health and safety documentation and follow-up on all issues.

Management is responsible for ensuring that their personal commitment to safety is both visible and meaningful. Management must lead by example in demonstrating the importance of a good EHSMS.

5.3 Environment, Health and Safety Committees

The Environment, Health and Safety (EH&S) Committees provide a means of transferring and sharing information with management and workers. All health, safety, and environmental issues or events that are brought forward will be reviewed and resolved to meet company needs and government regulations. Harvest has adopted a five tier committee and meeting system to facilitate communications.

5.4 EH&S Committee Structure



5.5 Safety Meetings

Safety meetings provide an opportunity for all workers to bring forward and discuss any EH&S issues. Safety meetings should be of an open forum format, conducive to discussion and effective information sharing. Safety meetings may include discussion or identification of hazards/unsafe work practices, review of emergency/standard operating procedures and/or training. Required corrective actions should be identified and a person and target date should be assigned. Issues, recommendations and corrective actions should be documented and tracked through safety meeting minutes. Outstanding corrective actions should be reviewed to track progress and ensure completion. It is important to follow-up on corrective actions to uphold worker confidence in resolving environment, health and safety issues and to ensure employee input continues.

There are primarily three types of safety meetings:

- EH&S Committee Meetings
- Tier 1-5 Safety Meetings
- Pre-Job Safety Meetings

EH&S issues may also be included, as required, as agenda items for staff meetings, project meetings and Board meetings.

5.5.1 EH&S Committee Meetings

EH&S Committee meetings will be held on a regular basis (minimum quarterly) and should be attended by all committee members or designates. The meetings will be conducted by a designated facilitator. EH&S Committees are required to establish and adopt a formal terms of reference. For details regarding the meeting agenda and scope please refer to the committee terms of reference.

5.5.2 Tier 5 Safety Meetings

Safety meetings will be held monthly at Harvest production operation work sites and will be attended by operators, leads and area foremen. Area superintendents and EH&S advisors are encouraged to attend when possible. Additional personnel such as contractors or facilities, drilling or well servicing personnel may attend as deemed appropriate.

It is the responsibility of the Tier 5 Committees and area foreman to ensure that meetings are carried out according to an established schedule and that the meeting is facilitated by a member of the Tier 5 Committee. These meetings should be scheduled with consideration for shift schedules so that all area workers may attend. The Tier 5 Committee is responsible for developing an agenda, follow-up on safety concerns and the documentation, distribution and filing of the safety meeting minutes. The Safety Meeting Minutes form should be utilized to help set the next agenda item, identify the meeting facilitator, and identify responsibility for follow-up items and to track

implementation. Refer to the Harvest EH&S manual Forms section; Safety Meeting Minutes.

Topics for regular safety meetings may include anything relevant to EH&S and should be tailored to the specfiic needs of the particular area. Additionally, contractors and subcontractors may be invited to discuess specific safety concerns. Outside speakers may be invited for training/presentation purposes. The format of a regular field safety meeting should include the following:

- Document meeting attendees
- Safety moment
- Review issues from the previous meeting
- Review recent incident, inspection and hazard identification reports
- Identify training needs
- Review a section of the EHSMS (e.g., responsibilities, incident reporting and investigation, code of practice) or specific work procedures. Obtain additional audiovisual materials if possible to support the topic
- Open the floor to new business. Go around the room and ask each individual for a new business item and assign a person and target date that is agreed to by the team
- Adjourn the meeting and confirm details of next meeting (e.g., date, time, chairperson, topics)
- Collect and file all meeting notes and distribute minutes to area foreman, superintendent and manager for review

5.5.3 Pre-Job Safety Meetings

Pre-job safety meetings are held at the beginning of each new job, task, or operation and every time the job scope changes. They should be repeated, as activities/hazards warrant (refer to the Harvest EHSMS Forms section; Site Specific Orientation & Hazard Assessment). They are a means of ensuring:

- That all workers understand the work to be performed
- The hazards associated with the work are identified and adequately controlled
- The steps of the task are done in a correct and safe manner
- That the required Personal Protective Equipment (PPE) is used
- That emergency procedures are in place and understood

Pre-job safety meetings will be conducted in conjunction with the safe work agreement system. The Receiver of a safe work agreement must ensure that a pre-job safety meeting is conducted with the work crew to effectively communicate any hazards and conditions of the agreement before work can proceed. In many cases the Receiver will conduct and document the meeting using their company's forms. If this is not the case, the pre-job safety meeting can be documented on the Site Specific Orientation & Hazard

Assessment form (refer to the Harvest EHSMS Forms section). For further details refer to the safe work agreement code of practice.

In some cases such as large construction projects or concurrent work, the Worksite Supervisor or Project Manager may conduct a formalized pre-job safety meeting with contractors, engineering representatives, operations personnel and EH&S advisors.

5.6 Other Communication Methods

Various additional methods can and should be used to regularly communicate environment, health and safety issues as follows:

- "Open-door policy" – workers should communicate directly to their immediate supervisor to discuss EH&S issues. Harvest will maintain an open, honest and trusting culture that will promote communication between workers and management.
- Daily/weekly field reports – field reports specific to drilling, well servicing, construction or production can also include information on EH&S issues.
- Drilling and completion programs / construction packages – are prepared by the project coordinator and sent to the Worksite Supervisor at the beginning of a project. In addition to the project details, these can include EH&S information and documentation.
- Incident reporting and investigation – facilitates communication of incidents, causes and remedial actions.
- Inspections – facilitate communication of corporate and regulatory requirements as well as any deficiencies.
- Alerts/Bulletins – may be prepared whenever a significant environment, health and safety issue or trend is identified. Alerts/Bulletins should be distributed to all workers and may be made available to all industry.

Appendix A - Tier 4 Safety Committee Terms of Reference

NOTE: The terms of reference are intended as the minimum requirements for the Tier 4 Safety Committees. Safety Committees operating in Saskatchewan and British Columbia are subject to specific requirements noted in the applicable provincial Occupational Health and Safety Regulations.

Mandate (primary function)

To assist with the implementation and assess compliance to Harvest EH&S standards.

RESPONSIBILITIES

- Participating in the identification and control of hazards
- Helping identify and resolve health and safety concerns of worker
- Receiving and distributing information, including publications sent from the EH&S department and or OHS Division
- Inspecting the workplace regularly
- Meeting regularly to discuss occupational health and safety concerns
- Maintaining records of meetings. Note: for Saskatchewan and British Columbia copies to be sent to the OH&S Division.
- Participating on investigation teams as required; investigating reportable incidents and dangerous occurrences
- Helping establish and promote health and safety programs and policies
- Helping develop and promote health and safety training
- Investigating refusals to work
- Carrying out responsibilities set by specific provincial regulations

MEMBERSHIP/STRUCTURE

The Committee must appoint a ‘worker’ co-chair and an ‘employer’ co-chair (mandatory in the Province of Saskatchewan and British Columbia). Membership terms may not exceed three years at which time the outgoing member must be replaced or re-assigned for a subsequent term.

MEETINGS

EH&S Committee meetings will be held on a regular basis (quarterly at a minimum) and should be attended by all Committee members or designates. The meetings will be conducted by a designated facilitator this will be one of the appointed co-chairpersons. Minutes for the meeting are to be recorded on the HOC Safety Meeting minutes form (refer to the HOC EHSMS Forms section: Safety Meeting Minutes). Saskatchewan and British Columbia committees must also record and submit meeting minutes on the applicable provincial forms.

INCIDENT REPORTING & INVESTIGATION

6.0 INCIDENT REPORTING & INVESTIGATION

IMPORTANT: Is this an Emergency? Is the event ongoing (emergency) or concluded (not an emergency)?

If the incident is deemed an emergency, take immediate action to eliminate or reduce any further risk and refer to the Harvest Corporate Emergency Response Plan (ERP) and the site specific emergency response plan if applicable. Review Appendix A for the EOC Contact Procedure.

If the incident is not deemed an emergency or when the emergency response has stood down then the incident must be reported and investigated as per this guideline.

6.1 Policy

It is the responsibility of all workers' to report and investigate all incidents and/or near misses regardless of their magnitude.

6.2 Introduction

Harvest has developed an incident reporting and investigation system in order to:

- Identify and document hazards and deficiencies that have not been adequately addressed.
- Investigate direct, indirect and root causes, communicate findings and implement corrective actions to minimize the potential for reoccurrence or more serious types of incidents.
- Establish an incident database to assist in hazard identification, risk assessment and control.
- Compile incident statistics for stewardship reporting purposes.
- Achieve and maintain compliance with regulatory requirements.

6.3 Training

Harvest uses DNV Systematic Causal Analysis Technique (SCAT) to determine root cause analysis. Any individual with the authority to close an incident is required to take DNV certified training.

All other staff, as designated, will be required to take the Incident Reporting & Investigation online training via ComplyWorks.

6.4 Incident Types

When entering the primary type (event) into Roughneck, secondary types must also be determined. Each incident is counted as one event, which may have multiple secondary types. In order to determine the primary type consider the events in the order of which they occurred. For example:

A vehicle rolls into a ditch striking a fence and the driver breaks his arm. The primary event is Motor Vehicle incident (type) secondary events are Property Damage incident (type) and Injury incident (type).

For reporting purposes, HOC has categorized incidents as:

Near Miss: An undesired event that under slightly different circumstances could have resulted in physical harm, property damage, or loss.

Hazard ID: A situation, condition, or behavior that has the potential to cause an injury or loss.

Fire/Explosion: An undesired event involving a fire or explosion that results or could have resulted in physical harm or damage to a person, property or the environment.

Theft: An undesired event resulting in lost property and/or equipment.

Vandalism: An undesired event resulting in damaged property and/or equipment.

Spill/Release: An undesired event resulting in the spill or release of any amount of product, chemical or material. Spills/releases may include onsite and/or offsite impacts.

Motor Vehicle: An undesired event involving a Harvest owned, contractor owned or rented motor vehicle that results or could have resulted in injury or damage.

Injury: An undesired event resulting in worker illness, first aid, medical aid, restricted work or lost time injury or fatality.

Property Damage: An undesired event resulting in damage to Harvest or 3rd party property.

Equipment Failure: An undesired event resulting in a failure of Harvest or 3rd party equipment (eg. Valves, piping, vessels, motors etc.)

Land Owner Complaint

6.5 Risk Assessment

The worker reporting, in consultation with the EH&S Advisor is responsible for evaluating the risk factor associated with the incident. The assigned risk factor is then used to determine notification and investigation requirements. There are three steps involved in assigning a risk factor:

1. Determine the potential severity of the incident (low, medium, high or unacceptable)
2. Determine the probability of the incident reoccurring (remote, possible, probable, expected)
3. Determine the risk factor (low, medium or unacceptable)

Refer to the risk matrices provided in Section 2 – Hazard Identification, Risk Assessment & Control for additional information on determining potential severity, probability and risk.

6.6 Incident Notification Requirements

Depending upon the type of incident as well as its associated risk factor, various internal and/or external parties may require notification. Notification requirements will be determined using the assigned risk factor and executed as per the Incident Notification Flowchart and the Incident Notification Matrix. The EH&S Advisor may provide further assistance in determining regulatory reporting requirements.

6.6.1 Internal Notification

All incidents must be reported to the first level of supervision and the appropriate EH&S Advisor. In addition:

- The Temporary Work Accommodation Form is to be completed at the earliest opportunity following a workplace incident / accident which has lead to illness or injury where medical attention was required.
- All spills/releases must also be reported to the Environment Coordinator
- All land owner complaints must be reported to the Surface Land Department
- Any failure of pressurized equipment must be reported to the Asset Integrity Manager.
- All Medium risk incidents must be reported to the second level of supervision
- All Unacceptable risk incidents must be reported to the third level of supervision
- Any event involving electrical equipment and Accidental contact with an energized source must be reported to the HOC Chief Electrical Inspector

6.6.2 External Notification

Incidents must be reported to Alberta Workplace Health and Safety if they:

- Result in a death;
- Cause a worker to be admitted to a hospital for more than two days;
- Involve an unplanned or uncontrolled explosion, fire or flood that causes a serious injury (or has the potential of causing a serious injury);
- Involve the collapse or upset of a crane, derrick or hoist; or
- Involve the collapse or failure of any component of a building or structure necessary for the integrity of the building structure

Injury incidents must be reported to Alberta Workers' Compensation Board if they:

- Cause (or are likely to cause) a worker to be off work beyond the day of injury.
- Require modified work beyond the day of injury.
- Require medical treatment beyond any first aid. (e.g., physical therapy, prescription medications, chiropractic).
- May result in a permanent disability (e.g. amputations, hearing loss).

Incidents must be reported to Work Safe Saskatchewan if they:

- Cause or may cause the death or a worker;
- Will require a worker to be admitted to a hospital as an in-patient for a period of 72 hours or more;
- Involve the structural failure or collapse of:
    - A structure, scaffold, temporary false work or concrete formwork; or
    - All or any part of an excavated shaft, tunnel, caisson, coffer dam, trench or excavation;
- Involve the failure of a crane or hoist or the overturning of a crane or unit of powered mobile equipment;
- Involve an accidental contact with an energized electrical conductor;
- Involve the bursting of a grinding wheel;
- Involve an uncontrolled spill or escape of a toxic, corrosive or explosive substance;
- Involve a premature detonation or accidental detonation of explosives;
- Involve the failure of an elevated or suspended platform; or
- Involve the failure of an atmosphere-supplying respirator.

Incidents must be reported to Work Safe British Columbia if they:

- Result in serious injury to or the death of a worker;

- Involve a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system or excavation;
- Involve the major release of a hazardous substance;
- Involve a blasting accident that results in injury, or unusual event involving explosives;
- Involve a diving incident that causes death, injury, or decompression sickness requiring treatment (required by regulation)

Incidents must be reported to the Alberta Regulator if:

- An unrefined product release of more than 2m3 on lease;
- Any substance release that may cause, is causing, or has caused an adverse effect (adverse effect is defined as “impairment of or damage to the environment, human health, or safety or property.”);
- Any substance release off lease;
- Any substance release into a water body;
- Any pipeline release or pipeline break (includes during pressure testing);
- Pipeline hits;
- Any uncontrolled gas release of more than 30,000m3;
- Any well flowing uncontrolled;
- Any fire caused by a flare or incinerator.

Incidents must be reported to the Saskatchewan Regulator if:

- Natural Gas: The release contains hydrogen sulphide in a concentration equal to or greater than 1000ppm, or 0.1 moles H2S/kilomole, as measured at the edge of the lease or property boundary;
- The released volume is equal to or greater than 2m3;
- The release is not contained on-lease, including releases that occur while the substance is being transported by a vehicle;
- The occurrence of a fire;
- The occurrence of a blow out;
- There is a break in or contact damage to a pipeline or flowline.

Incidents must be reported to the British Columbia Regulator if:

- A spill or release of any amount or material which impacts water ways;
- Hydrocarbons; 100L where the hydrocarbon contains no toxic material and does not impact water ways;
- Produced/salt water; 200L where the fluid contains no toxic materials;
- Fresh water; 10,000L
- Drilling or invert mud; 100L
- Sour natural gas; 10kg or 15m3 by volume where operating pressure is >100 PSI
- Condensate; 100L

- Any fluid including hydrocarbons, drilling fluids, invert mud, effluent, emulsions, etc. which contain toxic substances; 25L
- Any spill offsite or a pipeline release of any volume;
- Emergency flaring occurs; and
- A pipeline hit occurs.

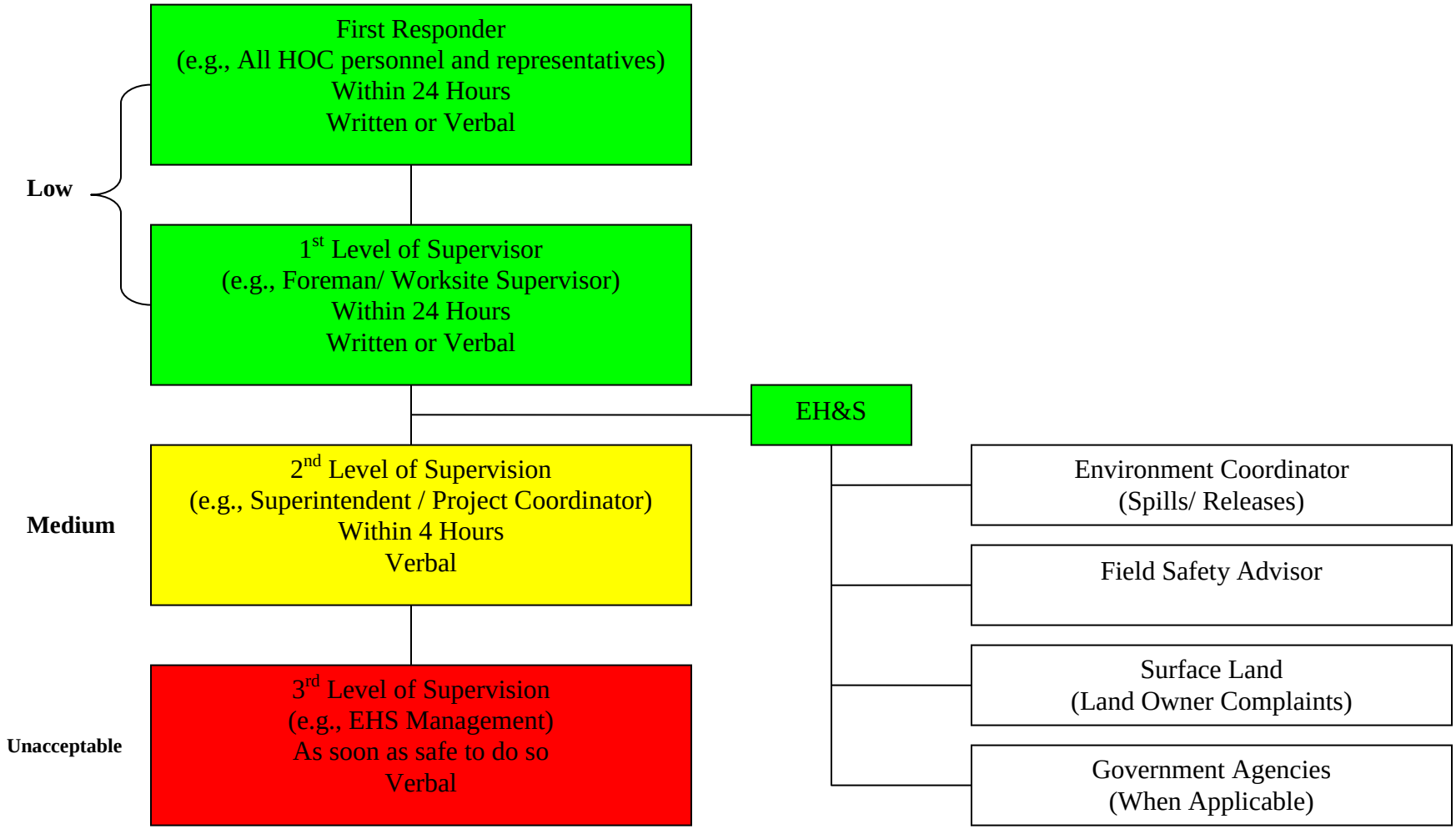
Depending on the nature and location of a spill or release, additional agencies may require notification under provincial or federal environmental protection legislation.

Transport Canada may require notification of spills that occur during the transportation or handling of TDG regulated products.

The following incidents involving pressure equipment must be reported to the HOC Asset Integrity Group who shall report to ABSA, BCSA, TSASK as applicable:

- Loss of containment which results in a fatality, injury, fire, explosion, equipment or property damage
- Fire involving pressure equipment
- Catastrophic loss of containment

6.6.3 Incident Notification Flowchart



6.6.4 Incident Notification Matrix

INCIDENT TYPE	DETAILS	Harvest Superv	Safety or Enviro Coord	AER/ SER/ OGC/ NEB	ENV Agency (Done by Env Coord)	Land Owner / Forestry	RCMP 911	OHS	WCB	TDG	Power Provider	ABSA BCSA TSASK	HOC Chief Electrical Insp
Spills and Releases													
Unrefined - AB	>2 m³ on lease, no adverse effect	X	E	X		X							
Unrefined - BC	>100 L oil on lease, no adverse effect	X	E	X		X							
Unrefined - BC	>200 L water on lease, no adverse effect	X	E	X		X							
Unrefined - SK	>2 m³ on lease, no adverse effect	X	E	X		X							
Unrefined	Any volume with adverse effect	X	E	X	X	X							
Unrefined	Any volume off lease	X	E	X		X							
Unrefined	Pipeline failure / leak, any volume	X	E	X		X							
Unrefined	Dangerous goods involving a vehicle	X	S	X			X			X			
Refined	Dangerous goods involving a vehicle	X	S		X		X			X			
Refined	Any volume whether on or off lease	X	E	X	X	X							
	Sour gas release	X	S	X		X							
	Blowout	X	S/E	X		X							
UNSCHEDULED FLARING													
	Flared volume exceeds approved limits	X	E	X	X	X							
	Flared emitting smoke or odors	X		X		X							
	Emergency flaring exceeds 4 hours in 24	X		X		X							
	Potential to cause an adverse effect	X	E	X	X	X							
ODOURS/ FUGITIVE EMISSIONS													
Unrefined	Any offsite	X		X		X							
SAFETY													
Near Miss	With serious potential for injury	X	S										
First Aid	With serious potential for injury	X	S										
Injury	Any loss of consciousness	X	S					X					
Injury – AB	Any requiring 48 hours hospitalization	X	S					X	X				
Injury – SK	Any requiring 72 hours hospitalization	X	S					X	X				
Injury – BC	Any serious injury	X	S						X				
Injury	Medical aid	X	S						X				
Fatality	Any	X	S				X	X	X				
Fire/Explosion	Any	X	S	X		X		X					
Electrical	Any event involving electrical equipment	X	S								X		X
Electrical	Accidental contact with energized source	X	S					X			X		X
Vessel / Boiler	Any involving failure or damage to	X	S									X	
Vessel / Boiler	Any test failure			X								X	
Pipeline	Any involving failure or damage to												
Pipeline	Any test failure												
Collapse	Scaffolds, cranes, structures, excavations	X	S		Any test failure	X	S	X	X				
Vehicle Acc	Any 3rd party involvement	X					X						
Pipeline Hit	Any	X	S/E	X		X							
Security Event	Any threat, trespass, or theft	X					X						
Public Safety	Any danger to public	X	S	X		X	X						
Property Dam	Any over $50,000	X	S										

6.7 Incident Reporting Requirements

A written report must be initiated within 48 hours following an incident. The preferred method of reporting is electronically via Roughneck. If Roughneck cannot be readily accessed, an incident report may be initiated by completing a Near Miss/Hazard Identification Form available in the Forms section of the EHSMS. Information from the Near Miss/Hazard Identification Form must be reviewed by the supervisor and subsequently entered into Roughneck.

The worker reporting the incident is responsible for completing the report to the best of their ability. The immediate supervisor, EH&S Advisor and other individuals involved in the review/investigation of the incident will provide assistance and contribute expertise as required.

The following general information (if applicable) is required:

- Incident Classification: Primary, and secondary incident types
- Location (district, area, field, LSD)
- General details (date/time incident occurred, date/time incident reported, reported by, Names and details of parties involved, functional group, incident description, immediate actions taken, suggestions for prevention)
- Risk assessment (loss severity potential, probability of recurrence, risk factor)
- Witness statements
- Estimated costs
- Attachments
- Causes (direct, indirect, root)
- Notifications (internal, external)
- Follow-up actions
- Review/investigation comments
- Signatures and or comments (reporter, reviewers, investigators)
- Status (open or closed)

The following additional information is required for spills/releases:

- Material spilled (petroleum crude, produced water, emulsion, waste water, lube oil, industrial non-hazardous waste, condensate, chemicals, natural gas, other)
- Volume spilled
- Volume recovered
- Location waste was shipped to and volume
- Whether or not it is a regulatory reportable spill
- Spill control services involved
- General details (ongoing, contained, off-lease impacts, distance, direction, area, potential receptors)
- Source (pipeline, tank, truck, wellhead, processing equipment, other)

- Pipeline data, if applicable (failure type, test failure, pipe material, cathodic protection, license number, line number, start and end locations, associated facility, external coating type, operating pressure, corrosion program, H_2S concentration)
- Spill cause

The following additional information is required for motor vehicle incidents:

- Vehicle type (ATV, bus/van, car, commercial hauler, commercial passenger vehicle, pick up truck, other)
- Type of incident (reportable – damages greater than $2000 and/or injury, non-reportable – damages less than $2000 and no injury, single vehicle roll over, head on, rear end, off road, hit fixed object, left turn, overhead object, rear end – other car hit us, sideswipe, backing – hit object, right turn, right angle – T-bone, overtaking, other)
- Driver details (name, driving experience, license number, insurance provider, insurance policy number, vehicle type, license plate number)
- Movement of vehicles and pedestrians at time of accident
- Conditions of drivers, pedestrians, vehicles, weather and roadway at time of accident
- Contributing factors

The following additional information is required for injury incidents:

- Name, contact information, employer, occupation of injured
- Injury type (first aid, medical aid, workplace illness, restricted work, lost time, fatality)
- Work experience of injured (total and with employer)
- Body part injured (eye, head, hand, foot, back, other)
- First aid and/or medical treatment given
- Nature of injury/illness
- Contact (slip/trip, fall, electrical contact, exposure to toxins, exposure to extreme temperatures, struck, cut, crushed, over exertions/strain, noise exposure, biological hazard, other)

The following additional information is required for equipment failure incidents:

- Equipment type (electrical/instrumentation, pipelines/risers, vessels/tanks, valves/piping, wellheads/pumpjacks/production equipment, pump/compressor systems, other)
- Equipment description
- Causal Factor(s) (design selection, construction, maintenance, operating practice, corrosion, other)

6.8 Incident Investigation Requirements

Incident investigation and follow-up help to determine why incidents occurred and aid in preventing reoccurrence. It is important to follow-up on incidents to ensure "closure". The objective of incident investigation is to identify the direct and underlying factors that contributed to the event and implement corrective actions to eliminate or control those factors. All incidents will be investigated; however the investigation team, level of supervisory review, depth of investigative analysis and extent of corrective action and follow-up communication will depend upon the type of incident and associated risk factor (as per the Incident Investigation Matrix).

INCIDENT INVESTIGATION MATRIX	
Unacceptable	**Incident Manager**: 3rd Level of Supervision (Functional Group Manager) **Investigation Team:** Multidisciplinary team with relevant expertise **Investigator:** EH&S **Reviewer:** 3rd Level of Supervision, EH&S **Causal Analysis:** Investigation of direct, indirect and root causes **Corrective Action:** As determined by root cause analysis. **Follow-up Communication:** Company wide (distribution of safety alert)
Medium	**Incident Manager:** 2nd Level of Supervision; 3rd Level and higher reserves the right to escalate. **Investigation Team:** First Responder, EH&S Advisor, 1st Level of Supervision **Investigator:** EH&S **Reviewer:** 2nd Level of Supervision, EH&S **Causal Analysis:** Investigation of direct, indirect and root causes **Corrective Action:** As determined by root cause analysis **Follow-up Communication:** Functional Groups or Company wide as required
Low	**Incident Manager:** 1st Level of Supervision; 2nd Level and higher reserves the right to escalate. **Investigation Team:** First Responder & 1st Level of Supervision **Investigator:** 1st Level of Supervision **Reviewer:** Incident Manager, EH&S **Causal Analysis:** Investigation of direct causes **Corrective Action:** Site specific equipment and procedures **Follow-up Communication:** Immediately affected workers

Note: Low risk incidents may be subject to a more thorough investigation when a notable trend is observed.

In general, the following steps will be followed in conducting an incident investigation:

- Secure the site. Do not disturb the scene of the incident except as necessary in attending to injured persons and preventing further harm or damage.
- Ensure all necessary notification is conducted as per the Incident Notification Flowchart.
- Assemble an appropriate investigation team as per the Incident Investigation Matrix.
- Conduct the investigation as soon as possible before conditions change, evidence is removed or altered, or people forget details.

- Gather information and develop a sequence of events.
    - Take photographs, measurements and make sketches as required.
    - Determine what happened and why by interviewing witnesses and others who work in the area, review work practices and procedures used and establish the conditions that existed at the time of the event.
    - Re-enact the event if necessary to gain additional data or to verify facts.
    - Tear down equipment, analyze parts and test materials as required to determine actual causes.

- Analyze the information collected to determine the direct, indirect and/or root causes as per the Incident Investigation Matrix.
    - Direct causes are factors that lead to the incident. Direct causes may include substandard actions such as failure to follow rules, procedures and/or guidelines or substandard conditions such as defective tools, equipment or materials.
    - Indirect causes are underlying factors that have contributed to the existence of direct causes. Indirect causes may include personal factors such as lack of knowledge or job factors such as inadequate leadership/job supervision.
    - Root causes are underlying system weaknesses that have contributed to the existence of direct and indirect causes. Root causes may include system design weaknesses such as missing or inadequate policies and procedures or implementation weaknesses such as inadequate enforcement.

- Identify, assign and implement corrective actions.
    - Corrective actions should relate to the direct, indirect and root causes of the event, restore the operation with minimum risk, minimize the possibility of reoccurrence of the events, and limit the severity of the event if it were to happen again.
    - Corrective actions may include engineering controls, administrative controls and/or personal protective equipment.
    - Specific follow-up instructions and work orders will be issued to ensure timely implementation.
    - Progress should be monitored to ensure completion. Specific tools such as Roughneck and safety meeting minutes will be utilized to track progress and completion.

- Conduct follow-up communication as per the Incident Investigation Matrix.
    - Investigation findings and corrective actions may be communicated through the work agreement system (e.g., pre job safety meeting), safety meetings or a safety alert.
- Complete supervisory review of the investigation as per the Incident Investigation Matrix.
    - The investigation should be reviewed for accuracy and completeness and to ensure that corrective actions are effectively implemented and communicated.
- Review and acknowledgement:
    - Low Risk Incident: Must be reviewed and acknowledged by way of a comments recorded in the roughneck report by the applicable incident manager and EH&S.
    - Medium Risk Incident: Must be reviewed and acknowledged by way of a comments recorded in the roughneck report by the applicable 2nd Level of Supervision and EH&S.
    - Unacceptable Risk Incident: Must be reviewed and acknowledged by way of a comments recorded in the roughneck report by the applicable 3rd Level of Supervision and EH&S.
- Closure of the incident investigation and report.
    - Low Risk Incident: 1st Level of Supervision, EH&S once all corrective actions have been implemented.
    - Medium Risk Incident: 2nd Level of Supervision, EH&S once all corrective actions have been implemented.
    - Unacceptable Risk Incident: EH&S once the investigation has been completed and all corrective actions have been implemented and signed off by senior management.

6.9 Responsibilities

EH&S Advisor

- Provide training and guidance regarding incident reporting and investigation requirements in their area of responsibility as per incident investigation matrix
- Lead and facilitate incident investigations in their area of responsibility (or as assigned):
    - Ensure that reports are complete and accurate
    - Ensure incidents are reported and reviewed as per the Incident Notification Flowchart
    - Assist in notifying regulatory agencies, as required

- Assist in determining direct, indirect and root causes
- Ensure that any required actions have been recorded, assigned and completed
- Prepare and/or advise a safety or regulatory alert as appropriate
- Recommend incidents for closure

First Responder (e.g., All HOC personnel and representatives)

- Take immediate action to eliminate or reduce any further risk following an incident.
- Immediately contact first level of supervision to determine if ERP should be initiated.
- Document all incidents and near misses.
- Contribute to the incident investigation:
  - identifying direct, indirect and root causes
  - identifying follow-up actions
  - completing assigned follow-up actions

1st Level of Supervision (e.g., Foreman/ Worksite Supervisor, Lead Operators)

- Ensure that action is taken to eliminate or reduce any further risk immediately following an incident
- Ensure all incidents in their area of supervision are reported
- Review all incidents reported in their area of supervision
- Assist in incident investigation:
  - identifying direct, indirect and root causes
  - identifying follow-up action
  - ensuring follow-up actions are completed
- Ensure all necessary notifications are completed as per the Incident Notification Flow Chart

2nd Level of Supervision (e.g., Superintendent/Project Coordinator)

- Review incidents as required by the Incident Investigation Matrix
- Assist in incident investigation as required:
  - identifying direct, indirect and root causes
  - identifying follow-up action
  - ensuring follow-up actions are completed
- Ensure all necessary notifications are completed as per the Incident Notification Flow Chart

3rd Level of Supervision (e.g., HOC Functional Group Management)

- Review incidents as required by the Incident Investigation Matrix
- Assist in incident investigation as required:
    - identifying direct, indirect and root causes
    - identifying follow-up action
    - ensuring follow-up actions are completed
- Ensure all necessary notifications are completed as per the Incident Notification Flow Chart

Incident Manager

- Confirms the level of incident (e.g., unacceptable, medium and low, as per the risk matrix and applies the investigation in accordance with the incident investigation flow chart)
- Establish and notify (engage) the investigation team members
- Oversee the investigation to ensure continuous progress
- Ensure investigation reviews and updates are conducted as required
- Assist the investigator in ensuring all personnel involved in the incident are readily available as required (e.g., interviews and provision of statements)

ENVIRONMENTAL MANAGEMENT PLAN

7.0 ENVIRONMENTAL MANAGEMENT PLAN

7.1 Introduction

Harvest Operations Corp. (HOC) is committed to conducting its work activities in a proactive manner that protects the environment and reduces the environmental impact of its operations. Each location should be left in as good or better condition than when work was initiated.

The Company will:

- Abide by all applicable environmental legislation, regulations, and industry standards.
- Integrate environmental management into its day-to-day activities, including planning and decision making processes.
- Identify potential environmental implications from its operations and take all reasonable steps to prevent any adverse effects.
- Respond to concerns from neighbouring communities and/or landowners about its work activities.
- Advocate environmentally responsible work processes and waste management practices, as well as respond to and report any environmental impacts resulting from its work activities.

7.2 Responsibilities and Training

HOC employees and contractors are responsible for compliance with the Environmental Management Plan (EMP) at all times. The company will be responsible for providing direction and ensuring personnel have access to industry standards and government regulations. Personnel are expected to know and comply with regulatory requirements.

7.3 Standards

HOC will develop and maintain an EMP that supports environmental preservation and protection. The programs will apply to all company activities and facilities. The EMP includes, but is not limited to, the following items.

7.3.1 Spill Response

HOC will respond quickly and efficiently to limit the impacts associated with spills. Spills will be contained, cleaned up and contaminated soils and/or ground water will be remediated as soon as possible to prevent further contamination.

In the event of a release, it is imperative that free product be immediately contained and removed from the surface in order to prevent additional impacts associated with a release. The environmental group in Calgary will work with field personnel to determine if an environmental technician will be dispatched to a spill for assistance in assessment and remediation.

HOC's Emergency Spill Response Steps are posted in each facility. As well, a copy is available on the HOC Intranet.

Primary responsibilities of a spill responder include:

- Assessing the area
- Shutting in the source (if possible),
- Containing free product (by building dikes or using absorbents)
- Notifying their immediate supervisor

HOC supervisor responsibilities include:

- Notifying the appropriate regulatory agencies
- Notifying the HOC environmental spill coordinator

The environmental coordinator is responsible for:

- Working with field personnel to determine if an environmental technician Will be dispatched to initiate site remediation
- Ensuring that written reports are correctly filled out and submitted to the Appropriate regulatory agencies on time
- Tracking all spills to ensure that remediation is carried out in an effective and efficient manner

7.3.2 Waste Management

Efforts shall be directed toward addressing the 4-R's – Reduce, Reuse, Recycle, and Recover – wherever possible.

In all activities and operations, domestic, hazardous and non-hazardous wastes shall be stored, handled, transported and recycled or disposed of in a manner which affords protection of the environment.

HOC shall track **all wastes** from the point of origin to the point of recycle/disposal, and shall document pertinent related information. Wastes are tracked either by manifest or truck ticket, depending on whether they are hazardous or non-hazardous. When returned to HOC by the receiving company, the **White Copy** of the Waste Manifest (or a copy of the truck ticket) must be forwarded to the EH&S Department in Calgary for tracking purposes.

Posters are located in main facilities and flip charts are available for information on filling out EUB (within Alberta) and Federal (for shipping products across provincial borders) Waste Manifests. Please consult the PowerPoint presentation on the Intranet for further clarification on waste management responsibilities and regulations.

7.3.3 Environmental Assessments, Remediation and Reclamation

Environmental Assessments should be conducted immediately for any spill and/or waste related issues. Remediation measures should then be implemented in order to reduce any environmental impact associated with the contaminant.

Environmental Assessments should also be conducted for all acquisitions, preferably before the acquisition in order to determine if significant environmental liabilities exist that would require “above normal” costs to clean up and reclaim.

7.3.4 Inspections

HOC will conduct regular environmental inspections on its work activities (operations, drilling, construction, exploration, etc.) to ensure compliance with all industry standards and regulatory requirements.

Company personnel and contractors will cooperate fully with any government agent conducting an inspection or investigation of a company facility. Deficiencies (directives and/or recommendations) arising from a government inspection or investigation shall be addressed promptly.

7.3.5 Air & Water Quality

HOC will meet the ambient air quality requirements as regulated along with efforts to reduce greenhouse gases, and submit environmental reports as required either by legislation and/or voluntary measures.

The company will ensure it meets water release requirements as legislated for surface runoff and facility licenses and approvals. It will also endeavour not to pollute ground water sources and will ensure that ground water monitoring and remediation is implemented if necessary.

7.3.6 Vegetation Management

HOC will manage vegetation according to sound industry practices and regulatory requirements. The company will utilize controls that do not adversely affect the environment and are also cost effective. If vegetation management is required, preference shall be for mechanical techniques. The use of chemicals that result in residual sterilization of the soil shall not be permitted. Records of herbicide applications shall be maintained.

7.3.7 Abandonment / Decommissioning / Reclamation

HOC will remove surface equipment and abandon pipelines and wells to meet the regulatory requirements. The company will reclaim the land to an equivalent land capability as per regulations and landowner requirements.

7.3.8 Regulatory Authorization

HOC will ensure that no project or operations proceeds until all applicable regulatory approvals and licenses have been obtained.

7.3.9 Planning

HOC will take every reasonable effort to avoid environmentally sensitive areas during site and route selection. Where technically and economically feasible alternatives are available, HOC will select these sites/routes if they would result in significantly fewer or less adverse environmental impacts.

Every reasonable effort will be taken to schedule activities so as to avoid the critical life history phases of sensitive species occupying habitats within the area.

All reasonable and practical efforts will be made to reduce clearing, ground disturbance, soil handling type activities, and disruption of water bodies.

7.3.10 Environmental Monitoring

HOC will ensure qualified personnel monitor projects and operations activities on a regular basis to ensure compliance with regulatory requirements and the Company's Environmental Management Plan. These monitoring activities will include but are not limited to: air emissions, water quality (surface and groundwater), soil conditions, vegetation controls, and noise emissions.

CONTRACTOR ENGAGEMENT

8.0 CONTRACTOR ENGAGEMENT

8.1 Policy

Harvest Operations Corp (Harvest) will evaluate contractors with regard to their capability to perform the work in a safe manner. Harvest does recognize and supports good safety performance when selecting contractors.

8.2 Introduction

This section outlines the process required to evaluate, select and approve contractors for hire. The Harvest Hiring Leader that is obtaining the contractor's services will have full responsibility to assure that the contractor has been appropriately evaluated prior to commencing work, and to monitor the continued safe work performance of the contractor.

8.3 Definitions

Contractor: A company who provides a service(s) on a Harvest project or site. Contractors are classified into the following categories:

- **Micro Contractors**: Micro contractors have between 1 and 3 employees and are required to follow the Harvest Safety Program. They are exempt from providing their historical safety data in the contractor engagement system.
- **Small Contractors**: A small contractor has between 4 and 99 employees
- **Large Contractor**: A Large contractor has 100 or more employees.
- **Contract Operators/ Consultants**: All contract operators/ consultants are required to follow the Harvest Safety Program. They are exempt from providing their historical safety data in the contractor engagement system.

Exempt Contractors: are those who are not required to work on or near any Harvest projects or worksites. If their work does require them to enter the Harvest project or worksite they will be under the direct supervision of a Harvest Worksite Supervisor at all times. Examples of exempt contractors are telephone repair personnel, office air-conditioning mechanics, photocopier repair mechanics, office courier services, sales representatives, etc.

TRIF: The Total Recordable Injury Frequency measures the number of total recordable injuries in the exposure period as a percentage of the workforce. It is calculated as follows:

$$\text{TRIF} = \frac{\text{Total Recordable Injuries} \times 200{,}000}{\text{Exposure Hours}}$$

CRIF: Similar to TRIF, the company specific TRIF measures the number of total recordable injuries in the exposure period as a percentage of the workforce. It is calculated as follows:

$$\text{CRIF} = \frac{\text{Total Recordable Injuries x number of employees x 2000}}{\text{Exposure Hours}}$$

LTIF: The Lost Time Injury Frequency measures the number of lost time injuries in the exposure period as a percentage of the workforce. It is calculated by multiplying the number of lost time injuries (LTI) by 200,000 and dividing by the exposure hours worked during the period. 100 workers work approximately 200,000 hours in one year.

$$\text{LTIF} = \frac{\text{Number of Lost Time Injuries x 200,000}}{\text{Exposure Hours}}$$

CLTIF: Similar to LTIF, the company specific CLTIF measures the number of lost time injuries in the exposure period as a percentage of the workforce. It is calculated as follows:

$$\text{CRIF} = \frac{\text{Number Lost Time Injuries x number of employees x 2000}}{\text{Exposure Hours}}$$

MSA: Master Service Agreement is a written legal agreement that defines all aspects of the business relationship between Harvest and the contractor.

8.4 Responsibilities

Hiring Leader:

- Utilizing the contractor engagement system when hiring contractors (www.complyworks.com).
- Verify that all Compliance Matrix – Level 1 Review has been completed prior to starting work
- Ensure contractors maintain full compliance on the contractor engagement system
- Apply enforcement action for non-compliance

In addition to pre-qualification, the Hiring Leader is responsible for ensuring the contractor:

- Is properly orientated and trained on applicable Harvest Policies, Codes of Practices, Rules, Procedures & Guidelines
- Has a clear Scope of Work
- Has appropriate supervision
- Has emergency contacts for the job

Worksite Supervisor:

- Verify contractors compliance on the contractor engagement system
- Check that all contractors on the Harvest project or worksite have an effective safety program and safe work procedures
- Ensure that all contractors receive a Site Specific Orientation & Hazard Assessment
- Issue all required Safe Work Agreements to contractors

Contractors' and Subcontractors

- In every case, whether one, two or more employers operate at the same site, each employer is responsible for the health and safety of their respective workers and ensuring compliance with the regulations for operations involving their workers
- Contractors are responsible for ensuring their workers are adequately trained and qualified for the job they will be conducting
- Contractors are responsible for ensuring their safety program meets all regulatory requirements, industry best practices and Harvest's environment, health and safety standards as they apply to the job
- While all parties have a responsibility to promote worker safety, the Contractor will provide a leadership role in promoting worker health & safety for their employees
- Contractors will report all accidents, incidents and near miss events to Harvest management. All reports will be reviewed and investigated as required by supervisors, managers, and/ or EH&S department to determine the root cause in order to implement corrective actions, and reduce risk of future loss.
- Contractors will supply and maintain insurance, WCB and environment, health and safety information on the HSE Registry (www.complyworks.com)
- Contractors will enter into a Master Service Agreement (MSA) with Harvest

Field Safety Advisors

- Assist Harvest Worksite Supervisors in determining the requirements for the submittal of a written safety plan, when required, and reviewing the plan;
- Conduct field audits to verify the implementation of the written safety plan where required
- Assist with or conduct level 2 audits and snap shot reviews when requested
- Provide training on the Contractor Engagement system
- Review completed audits and conduct field verification evaluations

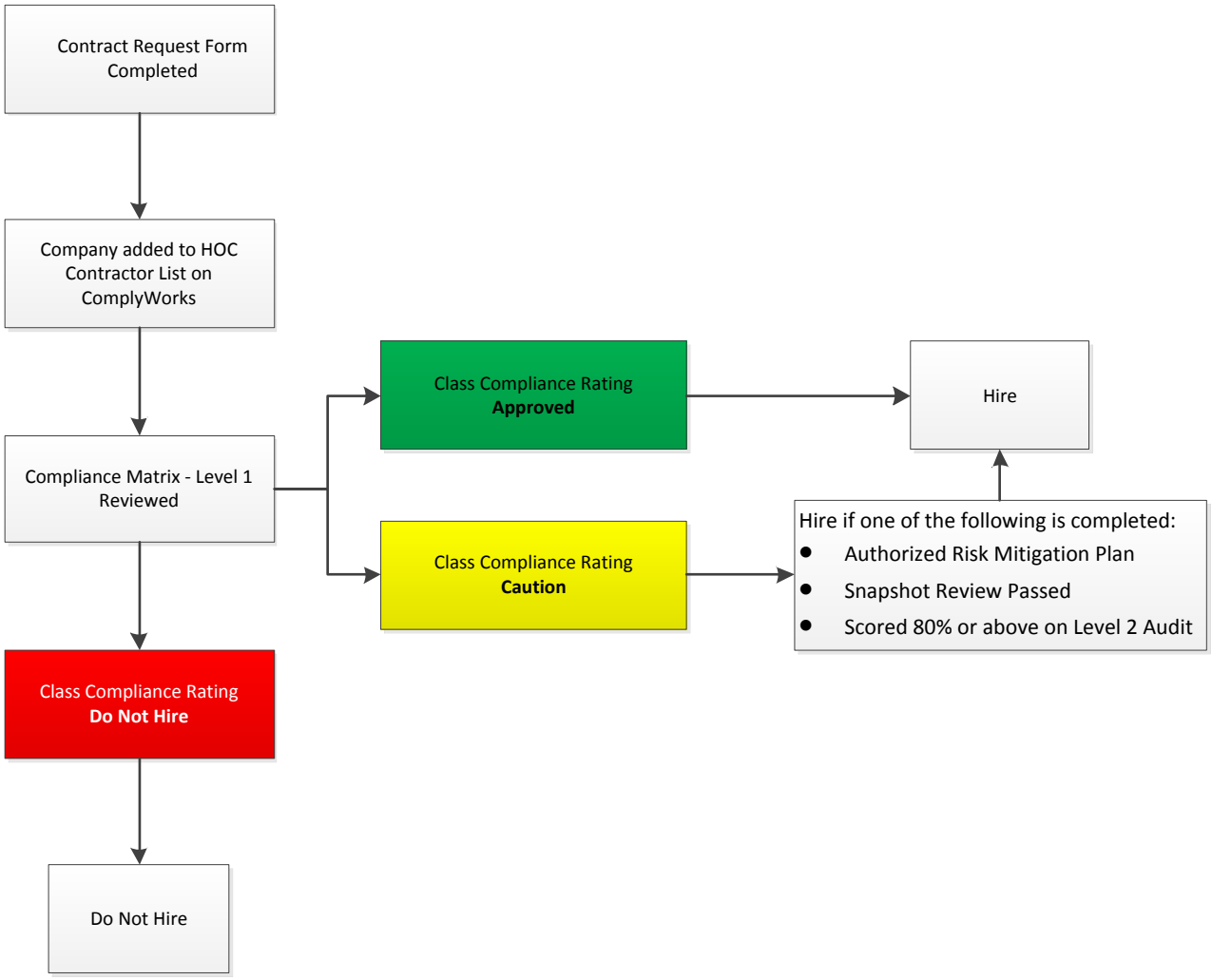
Contractor Engagement Coordinator

- Evaluate the Contractor Pre-qualification Safety Questionnaire via ComplyWorks. This evaluation may include:
  - Checking OH&S records for previous infractions

- Checking WCB records for rating standings
- Checking Certificate of Recognition (C.O.R.)
- Checking listed references for previous performance

- Evaluate the third Party Contractor's health and safety management system by conducting a Level 2 audit and snap shot reviews
- Assist Harvest Hiring Leader in determining the requirements for the submittal of a written safety plan, and reviewing the plan
- Provide stakeholders with training on the Contractor Engagement system

8.5 Process Flow Chart



8.6 Compliance Matrix – Level 1 Review via ComplyWorks

All contractors that conduct work on a Harvest worksite must be on the Harvest Contractors List on the ComplyWorks website (www.complyworks.com).

As part of the Level 1 Review; a Class Compliance Rating is generated through this Contractor Engagement System based on the contractor classification, insurance, WCB, safety questionnaire, historical safety data, etc. Any contractors with an unacceptable (Caution/ Do Not Hire) Class Compliance Rating must have further controls in place before proceeding with work.

8.6.1 Large Contractor Compliance Matrix (100+ employees)

Flag	Approved	Caution	DO NOT HIRE
Commercial General Liability Coverage	Valid insurance with minimum of $5M coverage (CGL or CGL + Umbrella)		• Missing Certificate of Insurance • Expired Certificate of Insurance • Insurance is less than $5M
Safety Stats	Data is provided for the previous year		Data is not provided for the previous year
TRIF	TRIF is equal to or less than 5.0	TRIF is greater than 5.1 Hire if one of the following is completed: • Authorized Risk Mitigation Plan • Snapshot Review Passed • Scored 80% or above on Level 2 Audit	Previous year's Total Recordable Incident(s) not entered: • Medical Aid • Restricted Work • Lost Time
LTIF	LTIF is equal to or less than 1.36	LTIF is greater than 1.37 Hire if one of the following is completed: • Authorized Risk Mitigation Plan • Snapshot Review Passed • Scored 80% or above on Level 2 Audit	Previous years Lost Time Incidents(s) not entered
Fatality	0	Fatality is equal to or greater than 1 in the past 3 years Hire if one of the following is completed: • Authorized Risk Mitigation Plan • Snapshot Review Passed • Scored 80% or above on Level 2 Audit	Previous years Fatality Incidents(s) not entered
WCB Clearance	WCB in good standings		• Missing WCB • Expired Certificate of Insurance
COR/SECOR	Valid COR/SECOR • Health & Safety Manual Uploaded		• No COR/SECOR • Expired COR/SECOR • No Health & Safety Manual Uploaded
Harvest Fitness for Work Policy	• Signed and uploaded document		• Did not sign and upload document
Alert / Suspended Noted		Alert Note	Suspended Note

8.6.2 Small Contractor Compliance Matrix (4 to 99 employees)

Flag	Approved	Caution	DO NOT HIRE
Commercial General Liability Coverage	Valid insurance with minimum of $5M coverage (CGL or CGL + Umbrella)		• Missing Certificate of Insurance • Expired Certificate of Insurance • Insurance is less than $5M
Safety Stats	Data is provided for the previous year		Data is not provided for the previous year
TRIF	TRIF is equal to or less than 5.0	TRIF is greater than 5.1 Hire if one of the following is completed: • Authorized Risk Mitigation Plan • Snapshot Review Passed • Scored 80% or above on Level 2 Audit	Previous year's Total Recordable Incident(s) not entered: • Medical Aid • Restricted Work • Lost Time
LTIF	LTIF is equal to or less than 1.36	LTIF is greater than 1.37 Hire if one of the following is completed: • Authorized Risk Mitigation Plan • Snapshot Review Passed • Scored 80% or above on Level 2 Audit	Previous years Lost Time Incidents(s) not entered
Fatality	0	Fatality is equal to or greater than 1 in the past 3 years Hire if one of the following is completed: • Authorized Risk Mitigation Plan • Snapshot Review Passed • Scored 80% or above on Level 2 Audit	Previous years Fatality Incidents(s) not entered
WCB Clearance	WCB in good standings		• Missing WCB • Expired Certificate of Insurance
Health & Safety Program	Health & Safety Program • Health & Safety Manual Uploaded		• No COR/SECOR • Expired COR/SECOR • No Health & Safety Manual Uploaded
Harvest Fitness for Work Policy	• Signed and uploaded document		• Did not sign and upload document
Alert / Suspended Noted		Alert Note	Suspended Note

8.6.3 Micro Contractor Compliance Matrix (1 to 3 employees)

Flag	Approved	CAUTION	DO NOT HIRE
Commercial General Liability Coverage	Valid insurance with minimum of $2M coverage (CGL or CGL + Umbrella)		• Missing Certificate of Insurance • Expired Certificate of Insurance • Insurance is less than $2M
WCB Clearance	WCB in good standings		• Missing WCB • Expired Certificate of Insurance
Harvest Fitness for Work Policy	• Signed and uploaded document		• Did not sign and upload document
Alert / Suspended Noted		Alert Note	Suspended Note

8.6.4 Contract Operator Compliance Matrix

Flag	Approved	Caution	DO NOT HIRE
Commercial General Liability Coverage	Valid insurance with minimum of $2M coverage (CGL or CGL + Umbrella)		• Missing Certificate of Insurance • Expired Certificate of Insurance • Insurance is less than $2M
WCB Clearance	WCB in good standings		• Missing WCB • Expired Certificate of Insurance
Harvest Fitness for Work Policy	• Signed and uploaded document		• Did not sign and upload document
Alert / Suspended Noted		Alert Note	Suspended Note

8.6.5 Consultant Compliance Matrix

Flag	Approved	Caution	DO NOT HIRE
Commercial General Liability Coverage	Valid insurance with minimum of $2M coverage (CGL or CGL + Umbrella)		• Missing Certificate of Insurance • Expired Certificate of Insurance • Insurance is less than $2M
WCB Clearance	WCB in good standings		• Missing WCB • Expired Certificate of Insurance
Harvest Fitness for Work Policy	• Signed and uploaded document		• Did not sign and upload document
Alert / Suspended Noted		Alert Note	Suspended Note

8.7 Snapshot Review

A Snapshot Review is conducted to verify that the contractor has adequately addressed the deficiencies within their health and safety management system to prevent a reoccurrence of past incidents.

Snapshot Reviews are evaluated by the Harvest EH&S Team. Reviews that receive a “Pass” are deemed acceptable for hire. Reviews that receive a “Fail” will be suspended for the remainder of that year. A Risk Mitigation Plan may still be used on a contractor that has received a failed on a Snapshot Review.

Note: Snapshot Reviews may result in a Level 2 Audit being initiated by the Harvest EH&S Team.

8.8 Level 2 Audit

A Level 2 Audit is a table top audit that reviews the contractor’s safety program to ensure that work is conducted with emphasis towards the safety of the public, personnel, facilities, and the environment.

A level 2 audit will be initiated for the following reasons:

1. Caution Compliance Rating
2. Serious incident
3. Request from Harvest Hiring Leader, Worksite Supervisor, and/or EH&S Team

The Level 2 Audit will contain the following 8 major elements:

1. Management Leadership and Commitment
2. Hazard Identification and Assessment
3. Hazard Control
4. Ongoing Inspections
5. Qualifications, Orientation and Training
6. Emergency Response
7. Accident and Incident Investigation
8. Review and improvement

Level 2 Audits are evaluated by the Harvest EH&S Team. Audits that receive a score of 80% or more are deemed acceptable to hire. Audits that receive below 80% will be suspended for the remainder of that year. A Risk Mitigation Plan may still be used on a contractor that has received below 80% on an Audit.

8.9 Risk Mitigation Plan

A Risk Mitigation Plan is a tool that is available to Hiring Leaders in order to allow a Caution contractor to provide services under a strict set of guidelines for a specific task and or project.

A Risk Mitigation Plan is implemented to ensure that the risks a contractor may pose to Harvest are managed and lowered to an acceptable level.

Acknowledgment of, and agreement to the conditions set out in the Risk Mitigation Plan by 1st 2nd and 3rd Level of Supervision (e.g. Foreman, Superintendent/ Project Coordinator, HOC Management, etc.) must be confirmed prior to commencement of work.

Note: A Risk Mitigation Plan only extends to a given task and or project that the contractor may be conducting. If further work is awarded to the contractor, the plan must be renewed.

Note: The Risk Mitigation Plan will contain the following minimum requirements:

- Justification for selecting contractor
- All hazards and or deficiencies identified, risk assessed and appropriate controls implemented
- All Mandatory Mitigation Plan Requirements have been completed/ reviewed including:
    - Daily Task Hazard Assessments conducted and documented
    - All workers have completed the Enform – Electronic General Safety Orientation (eGSO)
    - Site Specific Orientation delivered to all workers on-site
    - Verification of Employee Competency
    - Verification of valid training certification (First Aid, H2S, WHMIS & other relevant training requirements)
    - Other related Harvest requirements (outstanding documents; Insurance, WCB)
- Designate a Mitigation Plan Assignee to ensure the plan is adhered to
- All appropriate Levels of Supervision have reviewed and accepted the Risk Mitigation Plan
- A final review of the risk Mitigation Plan by EH&S (may be completed by area Field Health and Safety Advisor)

8.10 Contractor Suspension

Suspension of a service provider is an option that is available to hiring leaders in conjunction with advice from Harvest EH&S department if they deem necessary due to HSE related concerns.

Suspensions are implemented to ensure that the HSE concerns and related risks that the service provider may expose Harvest to are addressed and mitigated prior to recommencing work.

The suspension may be for a specific task, project, crew, individual worker or the entire line of services offered.

Reasons for suspension include but are not limited to:

- Service provider incurs an incident on Harvest worksite
- Service provider is non-compliant with Harvest Policies, Procedures and or Guideline
- Service provider fails to provide required safety data by appointed time

The duration of a Suspension will be dependent on the nature of the HSE concern and will only be lifted when the hiring leader and EH&S are satisfied the service provider has demonstrated that the risks have been managed to an acceptable level.

EMERGENCY RESPONSE

1.0 EMERGENCY RESPONSE

1.1 Emergency Response Plan

Harvest's Emergency Response Plans (ERP's) are written to protect the health and safety of workers, the public and the environment in the event of an emergency. Training and exercises will be conducted in accordance with all applicable regulations and legislation to ensure Harvest's response to any emergency will be efficient and effective.

1.1.1 Emergency Response Plan Responsibilities

Harvest Management

- Ensure that a corporate ERP is in place and updated as required
- Ensure that all new and existing facilities are reviewed to evaluate Site Specific ERP requirements
- Ensure all Site Specific and production ERPs are reviewed and updated annually, remain current and reviewed with site personnel
- Ensure that ERP binders, maps and other tools are readily available to all personnel that may be called upon to respond to an emergency
- Ensure effective emergency response exercises are conducted as required
- Actively participate in ERP training and exercises

Supervisors

- Fully understand their roles in an emergency response situation, as well as the role of the workers
- Ensure that workers are trained in accordance with all applicable regulations and legislation as to their role in the event of an emergency situation
- Assist in the development and periodical update of the ERP
- Ensure that ERP binders, maps and other tools are readily available to all personnel that may be called upon to respond to an emergency.
- Actively participate in the ERP training and exercises

Workers

- Familiarize themselves with the corporate ERP, Site Specific ERP's and production ERPs
- Fully understand their role in the event of an emergency
- Familiarize themselves with updates as issued.
- Actively participate in the ERP training and exercises.

Note: A complete list of the role and responsibilities of emergency responders can be found in the corporate ERP.

1.1.2 Emergency Response Steps

As a first responder, you are the Incident Commander until relieved by a more qualified person. Life and injury prevention are the first priority. As the Incident Commander protect yourself and others by following these seven steps:

1. **Evacuate:**
   Get away from the hazard – direct others to safe area
2. **Alarm:**
   Alert others to the danger and situation
3. **Call for Help:**
   Call 911 if deemed necessary
   Notify your supervisor
   If you cannot contact your supervisor, contact the EOC On-Call at **403-888-2540**
4. **Assess:**
   Assess hazards - don't just rush in and endanger yourself
   Account for all personnel
5. **Rescue:**
   Protect yourself at all times
   Use appropriate procedures and PPE
   Remove casualty to a safe area
   Ensure medical aid has been requested where necessary and administer first aid
6. **Secure the area:**
   Prevent unauthorized access
   If possible take steps to protect the environment, property and equipment
7. **Act as the Incident Commander until relieved by a more qualified person.**

1.1.3 Emergency Response Communication

Timely, clear and accurate communication is imperative to the effective management of any emergency and can save lives and mitigate the danger to the environment and to property.

- Whenever possible, eliminate the danger to life and health and the environment and then call for help
- If you cannot contact your supervisor, contact the EOC On-Call on 403.888.2540
- You will be asked to provide the following information:
    - Your name and contact number
    - Your location
    - The location of the emergency
    - The nature of the emergency
    - Any injuries involved
- The appropriate functional group manager must be notified of the situation as soon as practicably possible
- Certain government agencies may need to be notified of the situation; use the applicable provincial 'Notification Matrix' in the corporate ERP to determine which government agencies need to be notified
- When communicating with government agencies, state only what you know - do not guess
- If any Harvest personnel are approached by the media, they should be directed to the Harvest Information Officer (refer to the 'Media' section in the corporate ERP)

1.1.4 Specific Emergency Considerations

Natural Disasters

Thunder, Lightning and Winter Storms

Thunderstorm can be extremely severe and can produce large hail stones. A storm earns a rating of 'severe' when wind speeds exceed 58 miles per hour. Every thunderstorm produces lightning, which kills more people each year than tornadoes or hurricanes. Heavy rain from thunderstorms can cause flash flooding and high winds can damage homes and other buildings and blow down trees and utility poles, causing widespread power outages. Following these simple rules may help prevent serious injury to personnel:

- If possible, postpone outdoor activities if thunderstorms are likely to occur. Many people struck by lightning are not in the area where rain is occurring
- If working on a Harvest location, where possible, secure all equipment and suspend operations and move to a safe location
- Whenever possible, avoid driving when conditions include sleet, freezing rain or drizzle, snow or dense fog. If travel is necessary, keep a disaster supplies kit in your vehicle
- If you are driving when a storm hits, stop at the nearest shelter and wait for the storm to pass.
- If you are outside and cannot reach a safe building, avoid high ground; water; tall, isolated trees; and metal objects such as fences or bleachers. Picnic shelters, dugouts and sheds are not safe.
- Protect yourself from frostbite and hypothermia by wearing warm, loose-fitting, lightweight clothing in several layers. Stay indoors, if possible.
- During lightning storms do not go up on tanks or equipment. Take shelter in the office, process buildings or vehicle.

Tornadoes

There is no such thing as guaranteed safety inside a tornado and the most violent tornadoes can level buildings and endanger the occupants. Vehicles are extremely dangerous in a tornado. There is no safe option when caught in a car during a tornado, just slightly less-dangerous ones.

- If the tornado is visible, far away, and the traffic is light, you may be able to drive out of its path by moving at right angles to the tornado
- If possible, seek shelter in a sturdy building or underground. If you are caught by extreme winds or flying debris, park the car as quickly and safely as possible - out of the traffic lanes
- Stay in the car with the seat belt on. Put your head down below the windows; if possible, cover your head with your hands and a blanket, coat, or cushion
- If you can safely get noticeably lower than the level of the roadway, leave your car and lie in that area, covering your head with your hands
- Avoid seeking shelter under bridges which can create deadly traffic hazards while offering little protection against flying debris
- If you are outdoors, seek shelter in a sturdy building. If shelter can’t be found, lie flat and face-down on low ground, protecting the back of your head with your arms. Get as far away from trees and cars as you can; they may be blown onto you in a tornado

- If working on a Harvest location, where possible, secure equipment, suspend operations and move to a safe location

Wildfire, Forest or Prairie Fires

Drought and dry conditions throughout various times of the year increase the risk for wildfires. Careless use of fire in highly wooded areas can dramatically increase the chance of a wildfire, which can quickly spread across trees and dry brush and threaten homes and businesses that are in vicinity and cause severe damage over very large areas.

Whenever there is a danger of a forest fire occurring or during a forest fire, Harvest personnel should review the 'Forest Fire Assessment Matrix' contained in the Forms section of the EHSMS.

It is the responsibility of all personnel to follow the fire procedures for the facility they are working at and it is the responsibility of the worksite supervisor to ensure that all personnel are accounted for at one of the designated muster points in the facility. In the event that the muster points are not accessible, the worksite supervisor will determine an alternate muster point for personnel to meet. In every case, the safety of employees and public is the first priority.

In the event that the facility needs to be evacuated the worksite supervisor, in consultation (where possible) with management, will shut-in and evacuate the facility.

1.1.5 Telephone Bomb Threats

Bomb threats can be received by telephone, note, letter or e-mail. Most bomb threats are made by persons who want to create an atmosphere of general anxiety and panic.

All such threats must be taken seriously and handled as if there could be an explosive device located in or around the building.

Procedure for bomb threat by telephone call:

Upon receipt of a telephone bomb threat call, the following procedure must be followed to:

- Make every attempt to keep the caller on the line for as long as possible, and complete the Bomb Threat Recording Form (refer to the Forms section in the EHSMS)
- Do not hang up your telephone until instructed to do so
- If possible, enlist the assistance of the nearest co-worker indicating that you are receiving such a call
- Listen

- Be calm and courteous
- Do not interrupt the caller
- Obtain as much information as you can
- If possible ask someone to call 9-1-1 while the caller is still on the line

Use the following questions as a guideline to obtain pertinent information from the caller:

a) What time will the bomb explode?
b) Where is it?
c) Why did you place the bomb?
d) What does it look like?
e) Where are you calling from?
f) What is your name?

Record any identifying characteristics:

a) Sex
b) Estimated age
c) Accent
d) Voice (loud, soft, etc.)
e) Speech (fast, slow, etc.)
f) Diction (good, nasal, lisp, etc.)
g) Manner (calm, emotional, vulgar, etc.)
h) Background noises (traffic, trains, airplanes, other voices, etc.)
i) If the voice is familiar
j) Is the caller is familiar with the area

- Follow the instructions given by emergency personnel. Instructions may be given in person or over the public address system
- Do not go searching for the device but check your immediate work area to see if you notice anything suspicious
- Avoid using portable electronic devices that send or receive signals close to any suspicious package or device
- Advise as soon as possible:

    - Your supervisor
    - Emergency services
    - Functional group manager

Upon the discovery of an unusual, peculiar or in some way suspicious package or device that has the potential to be a bomb, the following procedure should be followed:

- Do not move or touch the object
- Notify your Supervisor immediately
- If the object in question is not readily identified, consider contacting emergency services
- Report as many details about the object to emergency services as possible, i.e. size, location, markings, materials, time of discovery etc.
- Clear all personnel from the vicinity of the object until the arrival of the Police Department

FORMS

10.0 FORMS

Blind/Blank Control List

Facility:	Safe Work Agreement(s):	
Equipment:	Date:	Number:
Location:	Date:	Number:

All blinds and blanks must be of an engineered design.

Blind ID #	Installation Sequence	Location of Blind/Blank	Size	Rating	Type	Installation Date SWA Issuers Initials	Removal Date SWA Issuers Initials

BOMB THREAT RECORD CALL

Threat Recipient's Particulars

Name: _____

Dept: _____

Date: _____ Time: _____

Duration of call: _____

Exact Wording of Threat

_____

_____

_____

_____

_____

Identifying Characteristics

Sex: _____ Estimated age:_____

Accent (Eng., Fr., etc.): _____

Voice (loud, soft, etc.): _____

Speech (fast, slow, etc.): _____

Diction (good, nasal, lisp, etc.): _____

Manner (calm, emotional, vulgar, etc.): _____

Background noises (traffic, animals, music, voices, etc.):

_____

_____

_____

_____

_____

Was voice familiar? _____

Was caller familiar with the area?_____

PROCEDURE TITLE: **BUILDING ENTRY for SOUR PRODUCTION AREAS**

PURPOSE: To establish minimum steps to ensure safe entry into buildings that may contain a hazardous sour gas atmosphere.

SPECIAL REQUIREMENTS:	**Y/N**		**Y/N**		**Y/N**
Check In/ Out (Monitoring System)	Y	Continuous Monitor		Personal Monitor	Y
Special Protective Clothing		Protective Gloves		Goggles/ Face Shield	
Respiratory Protection	Y	Safety Watch		Others:	
SCHEMATIC ATTACHED:		Yes No	***EQUIPMENT LIST:***		Yes No

TASK STEPS / ACTIONS	***CONTROLS / CONSIDERATIONS***
1. Check in with someone, field office, control room or co-worker to ensure they are aware of your activities and expected time out.	An effective communication link must be established prior to any work activity. This ensures that an emergency backup is aware of your activities.
2. Check facility or building warning lights (if so equipped).	If not, look, listen and smell for abnormal conditions. Note wind direction. Adhere to building warning signage.
3. Pack your vehicle facing off lease, no closer than 7.5 metres from facility.	If possible, park upwind with vehicle facing towards lease entrance. See electrical code regulations for Classifications regarding distances from wellhead or facility / building.
4. Dissipate any potential static electrical charge from your body.	Touch the outside or metal building. (If not a metal building, then a grounding rod should be installed and used).
5. Conduct an observation for anything unusual.	Look, listen and smell as you approach any buildings or facilities for abnormal conditions.
6. Check for H2S gas with a personal monitor if no fixed monitor in place.	If checking, insert a H_2S detector into a test port on the building wall/ décor on open the door slightly and place the detector inside while standing outside, away from the door. (Safe level for H_2S is below 10 PPM; otherwise Respiratory equipment must be utilized).
7. Ensure adequate ventilation	Maintain louvers open and not blocked and/or maintain door open.
8. Enter if safe. If not safe, DO NOT ENTER!	
9. If not safe, identify the problem and take corrective actions.	Corrective actions may include isolating, shut-in and ventilating.
10. Begin again at step #5.	
11. If still unsafe, notify your supervisor	Ensure you install a warning tag or other appropriate identification to warn other personnel of the unsafe situation.
12. Check out with whomever you checked in with.	

PROCEDURE TITLE: **BUILDING ENTRY for SWEET PRODUCTION AREAS**

PURPOSE: To establish minimum steps to ensure safe entry into buildings that may contain a hazardous sweet gas atmosphere.

SPECIAL REQUIREMENTS:	**Y/N**		**Y/N**		**Y/N**
Check In/ Out (Monitoring System)	Y	Continuous Monitor		Personal Monitor	Y
Special Protective Clothing		Protective Gloves		Goggles/ Face Shield	
Respiratory Protection	Y	Safety Watch		Others:	
SCHEMATIC ATTACHED:		Yes	No	***EQUIPMENT LIST:*** Yes	No

TASK STEPS / ACTIONS	***CONTROLS / CONSIDERATIONS***
1. Check in with someone if possible.	Whenever possible, check in with someone to identify your activities and establish your expected time out, as you never know when you might get into trouble and need assistance.
2. Check facility or building warning lights (if so equipped).	Observe the readings of the LEL alarms; note any burners out, etc. Note wind direction. Adhere to building warning signage.
3. Park your vehicle facing off lease, no closer than 7.5 metres from a facility.	If possible, park upwind with vehicle facing towards lease entrance. See electrical code regulations for Classifications regarding distance from wellhead or facility/ building.
4. Dissipate any potential static electrical charge from your body.	Touch the outside of metal building. (If not metal building then a grounding rod should be installed and used).
5. Conduct an observation for anything unusual.	Look, listen and smell as you approach any buildings or facilities for abnormal conditions.
6. Check for gas with a personal monitor if no fixed monitoring in place.	If checking, insert a LEL/O_2 detector into a test port on the building wall/ door or open the door slightly and place the detector inside while standing outside, away from the door. (Safe level for LEL is below 10% and safe level for oxygen is between 19.5% and 23%).
7. Ensure adequate ventilation.	Maintain louvers open and not blocked and/or maintain door open.
8. Enter if safe. If not safe, DO NOT ENTER!	
9. If not safe, identify the problem and take corrective actions.	Corrective actions may include isolating, shut-in and ventilating.
10. Begin again at step #5.	
11. If still unsafe, notify your supervisor.	Ensure you install a warning tag or other appropriate identification to warn other personnel of the unsafe situation.
12. Check out with whomever you checked in with	

Bypass Shutdown System Form

(Attach to Safe Work Agreement if applicable)

Job Location: **Sour ❑ or Sweet ❑**	**Safe Work Agreement:**
	Date:

Bypass System/Device/Equipment to be disabled:

Describe Why the System/Device/Equipment Must be Disabled:

Follow manufacturers instructions/specifications to bypass shutdown system Yes ❑ N/A ❑ (if N/A explain)

Appropriate technical drawings must be reviewed (e.g. P&IDs) Yes ❑ Drawing No.:
N/A ❑ (if N/A explain)

Potential Hazards	Hazard Controls	Responsibility Assigned to

Record Time/Date Disabled:	**Estimated Time Back in Service:**
Notify Facility Control Room: yes ❑ N/A ❑	**Notify other workers or work sites: yes ❑ N/A ❑**

The bypassed point will be left: Unattended ☐ or Attended ☐ for the duration of the work.

Name of Safety Watch:

Explain why left unattended:

Approved by:	**Consultant Review** (if required) print company name signature
Agreement Issuer:	**Agreement Receiver:**

Returning the System Back to Normal Operating Status

Time/date Shutdown System returned to Normal Operating Status: _____

Shutdown System restored by: _____ _____
Name (Print) Signature

System status confirmed by: _____ _____
Name (Print) Signature

Time/Date confirmed:

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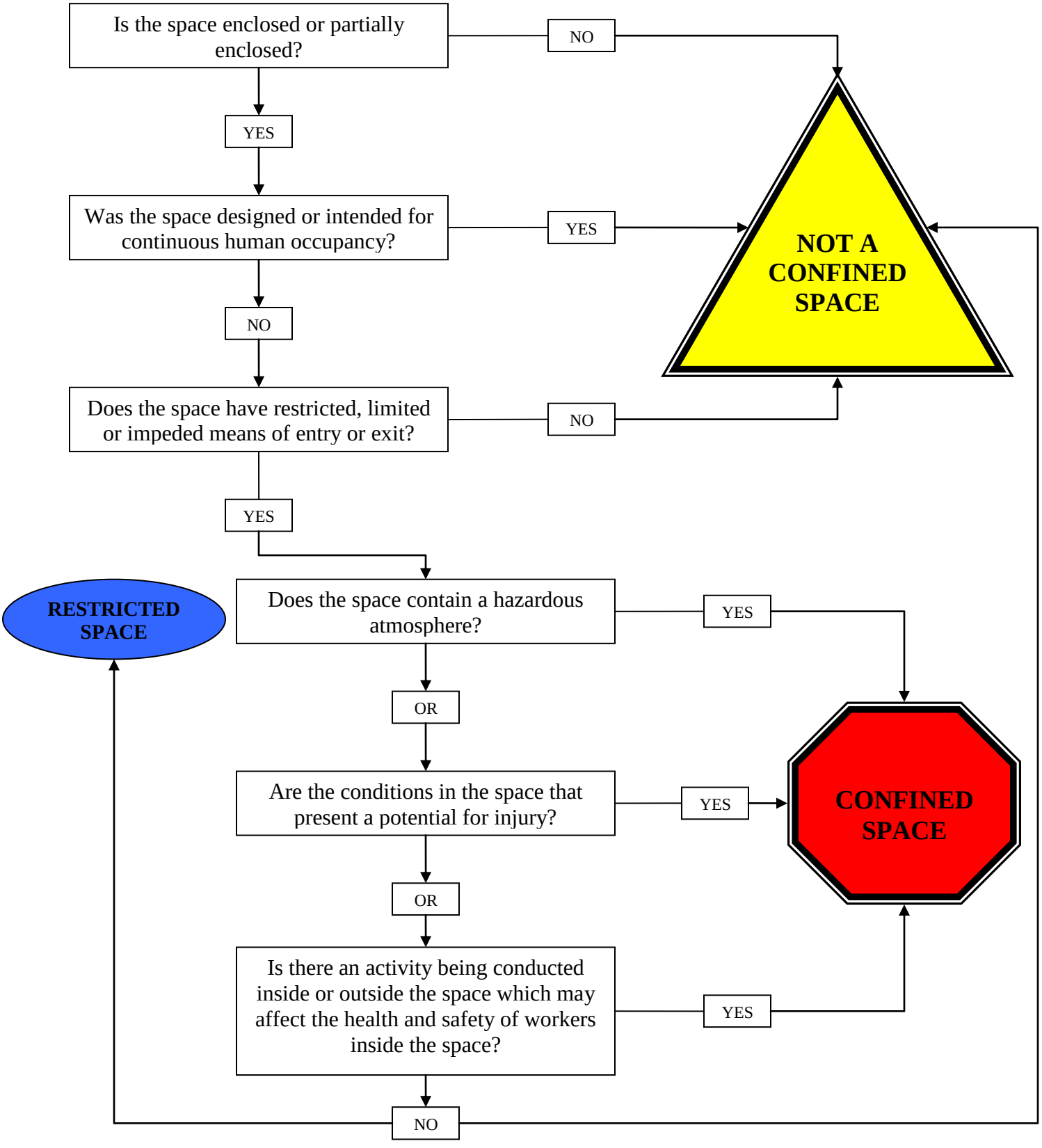
Confined Space Decision Chart



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Confined Space Entry Permit

Hazard Assessment & Control

Work site supervisor:		Safe work agreement No.
Phone no.		
Emergency Contact (Name)**:**		
Phone no.		
HOC Representative:		
Phone no.		
Date	**Location**	**Time**
Unique Equipment Identifier (e.g. Serial No.) *if applicable	**Equipment Description**	

Note: **All items must be reviewed with workers and acknowledged by circling Y *(yes)*, or NA *(not applicable). If not applicable explanation is mandatory*.**

CONFINED SPACE ENTRY CRITERIA CHECKLIST			**CONFINED SPACE DESCRIPTION/ COMMENTS**
1) Hazard Communication	**Yes**	**NA**	Any answers checked off "N/A" MUST be explained!
Has the entire scope of the confined space work been outlined and the safe work agreement been reviewed with all workers involved in the confined space entry?			
Have all the hazard controls identified in the Safe Work Agreement been implemented or completed?			
Is all piping blanked and blinded?			
Is all piping disconnected?			
Are double block and bleed procedures in place?			
Is a Blind list available and posted at the work site and reviewed by the confined space workers?			
Is a blind board applied?			
Have all electrical hazards been considered (including static)?			
Are electrical hazards isolated and/or de-energized as per the Lock-out/Tag-out C.O.P.)			
Have physical and thermal hazards been identified? If yes, controls must be in place?			
Have Noise hazards been identified? If yes, controls must be in place.			
Are heater Exhaust gases prevented from entering the space?			
Is necessary Ventilation equipment available? If yes, the air displacement calculation must be completed			
Is low voltage or GFI protection lighting available?			
Are there other access points into this confined space? If yes, safety watch must be posted to prevent unauthorized access.			
Are workers adequately trained to use available respiratory equipment?			
Could adjacent equipment/activities present a hazardous atmosphere? If yes, controls must be implemented.			
Could equipment/material being brought into the confined space create a hazardous atmosphere? If yes, controls must be implemented.			
Is a working at heights plan required? If yes, completed fall protection plan.			
2) Emergency and Rescue	Safety watch(s) posted? – Yes/ No		Name(s)
	Yes	**NA**	Method
Is rescue and respiratory equipment readily available and serviced?			
Are necessary body harness and lifelines available? (*Safety watch must attend lifelines at all times*.)			
Is the rescue plan clearly understood by all personnel?			
Is adequate manpower/equipment available for the rescue? ***(Safety watch must not enter the confined space until backup has arrived)***			

3) Communication methods established	Yes	NA	Method
Between safety watch and workers?			
Between safety watch and backup personnel?			
Between safety watch and rescue team.			
Are communication systems operational?			
4) Job Completion	**Yes**	**NA**	Method
All blinds and blanks removed and accounted for (refer to blind and blank lists)			
All locks and tags removed and accounted for (refer to lock out and tag out lists)			
Have all personnel involved in the confined space been accounted for?			

One copy of this form must be posted at the confined space entry point

I have reviewed and understand the requirements for this confined space entry!

Print	Sign	Radio #	Print	Sign	Radio #

File with all respective Safe Work Agreements (2 years minimum).

Atmospheric Testing	Oxygen	LEL	Toxic Gas/ Substance	Substance Test	Time	Testers Signature
1st Test	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			

Testing Equipment				
Make	**Model**	**Serial #**	**Calibration**	**Date**

DUE DILIGENCE CHECKLIST
Hiring Contractors & Subcontractors

Supervisors Name: _____
Date: _____
Location: _____
Activity: _____

Question	Y	N	N/A	Comments
1. Have you completed the "Contract Request" form? (review the checklist on the reverse of the form)				
2. Have you confirmed or arranged for a Master Services Agreement (MSA) from the Contracts Group?				
3. Have you confirmed that there is appropriate Insurance and WCB coverage for the applicable Province(s) where the work will be conducted?				
4. Have you discussed Harvests commitment and expectations in regard to the HOC Environment, Health and Safety program with consultant/contractor?				
5. Have you assessed the consultant/contractor competency for the project and verified any relevant qualifications and training requirements? a. Obtain any relevant training certification b. Provide to EH&S department OR ensure consultant/contractor uploads onto ComplyWorks				
6. Have you contacted the EH&S Team ehs@harvestenergy.ca and arranged for an orientation including any required Codes of Practice training? • Level 4 EH&S Corporate Orientation i. Safe Work Agreement Training (mandatory) ii. Ground Disturbance for those supervising any ground disturbance work • Enform – eGSO (consultant and contractors) Review any relevant alerts with the consultant/contractor (alerts can be found on ComplyWorks under the "StorWorks" tab				
7. Have you ensured that the consultant has received a Harvest EH&S manual on flash drive? (contact the EH&S team ehs@harvestenergy.ca & arrange for an orientation package)				
8. Have you reviewed the responsibilities of the Worksite Supervisor with the consultant/contractor? Refer to Section 1.4.5 of the EH&S program				
9. Have you confirmed with the consultant/contractor that it is an HOC requirement that all incidents are to be immediately reported to the Harvest Supervisor and EH&S advisor? • After hours emergencies are to be directed to EOC On-Call Director at 403-888-2540 • Ensure consultant is enrolled on Roughneck (contact the EH&S Team at ehs@harvestenergy.ca for assistance)				
10. Have you provided the consultant/contractor with all of the relevant documentation detailing the entire Scope of Work for the project? • Construction package, work-over or drilling program • Notice of Supervisor form to be completed and posted at the worksite • Due Diligence Checklist for Worksite Supervisors • ERP template completed, reviewed with all workers and posted on site				
11. Have you directed the consultant/contractor to contact the Area Production foreman prior to commencement of work? • Best practice is to provide at least 48 hours notice prior to being on site				
12. Is there going to be a Pre-Job kick-off meeting? • Ensure area EH&S advisor is notified and arrange for a field visit to review EH&S requirements including: i. ComplyWorks training ii. Completion of documentation a. Turnover Agreement b. Safe Work Agreement (Hot or Cold) c. Hazard Assessment/Pre-Job Meeting d. Ground disturbance Checklist (as required) e. ERP Template f. Working in Proximity to Overhead PowerLines g. Confined Space permit (as required) iii. Roughneck Training iv. SDS Training				
13. Are you going to conduct an EH&S Inspection of the worksite during your field visit?				
14. **Do you believe that you have done everything reasonably practicable to protect the health and safety of the workers, the public, yourself and then environment?**				

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DUE DILIGENCE CHECKLIST FOR WORKSITE SUPERVISION

Supervisors Name: _____
Date: _____
Location: _____
Activity: _____

Question	Y	N	N/A	Comments
1. Do you know who the area operating authority is and how to contact them?				
2. Do you have the authority to proceed with work? (i.e. Construction Package for Grassroots site or Turnover Agreement for live Operating site)				
3. Has the site been correctly Turned Over to you? E.g. are you aware of the existing on-site hazards and how they will be managed?				
4. Have you identified yourself as Site Supervisor to all of those on site?				
5. If working in Saskatchewan, have you completed and posted the "Notice of Supervisor" form?				
6. If necessary, have you designated and identified an alternate supervisor in the event that you become incapacitated?				
7. Do you have a complete and thorough understanding of the scope of work to be conducted?				
8. Do you know the steps to be taken if there is a change in the work scope?				
9. Are the contractor(s) to be used on the HOC Approved Contractors list? Refer to ComplyWorks access and sign in procedures attached.				
10. Have ALL workers completed the online Enform – eGSO?				
11. Have you assessed worker competency? (verify the worker has the required certifications; e.g. crane operator's certification) Is the worker fit for work?				
12. Have you identified new or young workers on the site and have you implemented risk controls to mitigate the associated risks (e.g. supervision, appropriate task assignment)?				
13. Are all workers (self included) aware of the "Right and Responsibility to Refuse Unsafe Work" legislation and the procedures to be followed in the event of a work refusal?				
14. Have you considered federal, provincial legislation and industry best practices (e.g. OHS)? For details refer to the EH&S flash drive.				
15. During your Hazard Assessment, did you identify any hazards that require additional documentation to be completed or specialized procedures (JSA) to be implemented? E.g. Ground Disturbance Checklist, Working in Proximity to Overhead PowerLines, Critical Lift Plan, Fire & Explosion Plan, LOTO etc.Have you communicated the identified hazards and controls to ALL stakeholders on and off site?				
16. In the event of an Emergency, do you know the 7 initial emergency response steps and how to communicate this to the work crew?				
17. Have you completed and posted your Site Specific ERP and are all workers on site aware of their roles and responsibilities in the event of an emergency?				
18. Do you have the HOC Corporate Emergency Response call-in number at hand and does your alternate know the protocol? **1 800 760-2826**				
19. Consider and plan for continuous monitoring of the site to ensure compliance with safety standards are upheld. Implement a formal periodic inspection system; utilize the following HOC form: a. Job Observation Checklist				
20. Do you have the all of the appropriate HOC documentation and tools required to conduct the work at hand? a. HOC Flash Drive i. Harvest EH&S policy ii. Harvest EH&S manual iii. Links to and copies of OHS legislation (BC, AB & SK) iv. Waste management guidelines v. HOC Corporate ERP b. ComplyWorks password c. Safe Work Agreements d. Ground Disturbance Checklists e. Hazard Assessment matrix f. Working in proximity to overhead PowerLines g. Near miss/hazard identification forms h. HOC ERP contact list i. Confined space permits j. Pre-job safety meeting forms				
21. Do you believe that you have done everything reasonably practicable to protect the health and safety of the workers, the public, yourself and the environment?				

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Field Safety Orientation

Facility / Location:_____
Date:_____

To be addressed before work starts

Safety Responsibilities

Your responsibilities are to:

- Protect the health and safety of yourself and other personnel on the work site.
- **Identify and refuse unsafe work and refuse to perform work for which you are not adequately trained.**
- Ensure you and all other workers are properly trained to perform their job and are aware of their responsibilities.
- Comply with government regulations, industry standards and company guidelines.
- Ensure appropriate tools and safety equipment are used and maintained in a safe manner.
- Ensure you and all other workers use required safety and personal protective equipment.
- Ensure that you and all other workers understand the Working Alone Considerations/Controls.
- Report accidents, potential hazards and any environmental concerns to your immediate supervisor.

HOC Key Point Standards

Alcohol and/or Illegal Drugs are prohibited on any HOC work site. Workers under prescribed or over-the-counter medication should notify their supervisor in case of side effects that may impair their ability to work. "Zero Tolerance"

Beards, moustaches or excessive facial hair prevent a proper facial seal and therefore are prohibited where the use of respiratory protective equipment may be required. The worker must be clean shaven where the face piece of the equipment seals to the skin of the face.

Hair must be cut short or completely confined where there is a danger of it getting caught or contacting moving equipment.

Housekeeping is a must. Work areas must be kept clean and free of obstructions. Spilled toxic or corrosive chemicals must be cleaned up and all wastes must be disposed of properly.

Cheater cords are not routine equipment and must be used under the direction of a Hot Work Permit.

Ladders must be inspected before use, secured at the top when being worked from, extends 3' above platform and you cannot work from top 2 rungs.

Cranes and Hoists must only be operated by properly trained personnel (certified for pickers over 5 ton). Workers must not stand on or under suspended loads. Tag lines must be used where workers may be in danger of a moving load. Only devices built and approved for that purpose shall be used to lift people.

Ground Disturbance guidelines must be reviewed and a Ground Disturbance Checklist must be completed before any ground disturbance activity takes place. Designated Ground Disturbance Supervisor / alternate must have 3rd party training certification and Harvest Operations Corp. Ground Disturbance Guideline training.

Excavations and Trenches exceeding 1.2 m depth cannot be entered unless personnel are protected from cave-ins or sloughing material (proper shoring, trench cut back, or engineered device), less, if a worker will be laying or kneeling in the excavation.

Personal Protective Equipment requirements are:

- ANSI or CSA approved hard hats.
- Appropriate CSA approved safety-toed boots.
- Fire retardant outer work wear (including hoods) with reflective stripes. (Nylon or Synthetic clothing is prohibited where hydrocarbons may be present).
- Hoodies must be fire retardant with tear away hoods, the strings removed and have reflective striping if it is worn as the outer most layer of clothing.
- Safety glasses with side shields. Face shields or goggles for grinding and chemical goggles when handling chemicals.
- Personal monitors that are capable of detecting H2S, LEL, O2, CO
- Hearing protection in areas where noise levels exceed 85 dBA, dual protection in areas over 96 dBA. (80 dBA in Sask).
- CSA approved safety harness and lifelines when working more than 3 meters above the ground or above a permanent work platform.

Power Lines must be identified before working near them. See Working in Proximity to Overhead Power Lines Guideline.

Zero Energy must be achieved for all sources of energy. Every worker conducting maintenance or repairs must lock out the equipment they are working on, following Zero Energy / Lockout Guidelines.

All diesel engines must be equipped with an operational automatic positive air shut off when working in classified areas.

Smoking is prohibited except in designated areas. Designated areas must be at least 25 meters from any potential hydrocarbon source.

Water quality: Identify area where drinking water (potable) is available.

Firearms, Weapons or Explosives: Firearms (other than flare guns required onsite), weapons or explosives are not permitted at the worksite or in the company vehicle unless authorized in writing by management for work related reasons. Where firearms are deemed to be required for protection (e.g., Bears, Wolf County, etc.) expressed written permission must be obtained from at least two levels of supervision.

Environmental Controls

Harvest Operations Corp. expectation is "Nothing hits the ground". Environmental Controls must be identified prior to starting work activities and workers must be aware of controls including waste management issues (handling, storage, disposal, NORM's) spill Mitigation (drip trays, containment).

Health Hazards

Some of the substances you may be exposed to while working on this site can be harmful to your health. Additional PPE may be required when working with asbestos, benzene, heavy metals, hydrogen sulfide, pesticides, radioactive material (NORM), solvents and acids. Refer to applicable MSDS sheets and Harvest Operations Corp. Codes of Practice and Guidelines for further information.

Training

Personnel must be trained as required by OH&S/WCB regulations and Harvest Operations Corp.

- First Aid
- H_2S Alive
- WHMIS
- TDG

See Training Matrix in Harvest Operations Corp. EHS Manual for task specific training.

Emergency Response

Workers must be familiar with the site Emergency Response Plans, alarms, beacons, and muster points and local Contact Numbers.

Emergency Response First Steps:

1. Evacuate
2. Alarm
3. Call for help
4. Assess the hazards
5. Rescue victims
6. Secure the area
7. Act as onsite supervisor

Emergency Equipment

All workers must be familiar with the location of the first aid kits, eyewash stations, emergency showers, fire extinguishers, spill kits and respiratory breathing equipment.

Emergency Transportation

Review site emergency transportation plan with all workers for sites >40 minutes travel time from a health care facility (20 min's in BC).

Event (Accident/Incident) Reports

All hazards, accidents, spills and near misses that occur on the job must be reported immediately to the site supervisor.

Hazard Identification / Assessment

Personnel must be aware of the scope of the job, and perform a Hazard Assessment before work starts. The Hazard Assessment will identify the hazards that may be encountered and the necessary controls, such as safe operating practices, JSA's, special equipment, personal protective equipment, etc.

If conditions change from those identified during the hazard assessment, all work must stop, and the hazards reassessed and documented.

Pre-Job Safety Meetings

Pre-job safety meeting must be held prior to starting work or undertaking a hazardous or potentially hazardous activity. If the job scope changes, work must stop and job will be reassessed.

- Ensure everyone on lease understands the work to be done, hazards that may be encountered and safety precautions to be taken.
- Document the meeting separately or as part of the hazard identification / assessment process.
- Document attendance records of all personnel at meeting.

Violence in the work place

Any act of violence committed by or against any worker or member of the public is unacceptable conduct and will not be tolerated.

10 Key Principles for All Work Activities:

1. Identify the Harvest Operating Authority
2. Acquire authority to proceed with work
3. Identify & document names of Worksite Supervisor and Alternate
4. Identify scope of work, list tasks (Stop if scope changes)
5. Assess competency for the tasks at hand
6. Identify hazards & assess risks (Include those related to concurrent work)
7. Identify risk controls & assign any required actions
8. Ensure compliance with regulations
9. Plan Site Emergency Response (Contacts, Muster Area)
10. Review with all workers & document

HOC Emergency # 1-800-760-2826

Field Safety Orientation

I have successfully completed the Harvest Orientation quiz and I agree to comply with all policies, procedures and regulations as outlined.

Worker Signature _____ Print _____

Company _____

Worksite Supervisor Signature _____ Print _____

To be retained by Worksite supervisor for the duration of the scope of work

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FIELD SAFETY ORIENTATION
INTRODUCTION

Name: _____ Date: _____

Company: _____ Phone: _____

PLEASE COMPLETE BY CHECKING OFF THE CORRECT ANSWER PER QUESTION.

1 A Site Specific Orientation must be completed prior to commencing work.
- ☒ a. True
- ☐ b. False

2 A Level 3 Orientation outlines your safety responsibilities.
- ☒ a. True
- ☐ b. False

3 It is your responsibility to stop work if there are unsafe actions or conditions.
- ☒ a. True
- ☒ b. False

4 Harvest has 10 Key Principles for all work activities on all Harvest work sites.
- ☒ a. True
- ☐ b. False

5 A properly completed Site Specific Orientation is all that needs to be done prior to work commencing to guarantee that a workplace is safe.
- ☐ a. True
- ☒ b. False

6 Personnel must be trained as required by OH&S/WCB regulations and Harvest Operations Corp. this includes:
- ☐ a. First Aid
- ☐ b. H2S Alive
- ☐ c. WHMIS and TDG
- ☒ d. All of the above

7 Which of the following is part of the Emergency Response First Steps:
- ☐ a. Contact On Site Supervisor
- ☒ b. Assess the hazards
- ☐ c. Put out the fire
- ☐ d. Call family members

8 Designated Ground Disturbance Supervisor / alternate must have 3rd party training certification (Level 2) and Harvest Operations Corp. Ground Disturbance Code of Practice training.
- ☒ a. True
- ☐ b. False

9 Cheater cords are not routine equipment and must be used under the direction of a Hot Work Permit.
- ☒ a. True
- ☐ b. False

10 Personnel must be aware and understand the scope of the job, perform a Hazard Assessment and implement controls before work starts.
- ☒ a. True
- ☐ b. False

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11 Workers taking prescribed or over-the-counter medication should notify their supervisor in case of side effects.

- [x] a. True
- [ ] b. False

12 Which type of events must be reported:

- [ ] a. Injury
- [ ] b. Hazards
- [ ] c. Spills
- [x] d. All of the above

13 Beards, moustaches or excessive facial hair that may prevent a proper facial seal, are prohibited where the use of respiratory protective equipment may be required.

- [x] a. True
- [ ] b. False

14 Environmental Controls must not be identified prior to starting work activities and workers need not be aware of controls including waste management issues (handling, storage, disposal, NORM's) Spill Mitigation (drip trays, containment).

- [ ] a. True
- [x] b. False

15 "Acquire authority to proceed with work" is one of the steps in the 10 Key Principles:

- [x] a. True
- [ ] b. False

16 If the job scope or conditions change, or there is an emergency, work can carry on without stopping and reassessing as long as nobody appears to be in immediate danger.

- [ ] a. True
- [x] b. False

17 One of your responsibilities is to report accidents, potential hazards and any environmental concerns to your immediate supervisor.

- [x] a. True
- [ ] b. False

18 All workers must be familiar with the location of the first aid kits, eyewash stations, emergency showers, fire extinguishers and respiratory breathing equipment.

- [x] a. True
- [ ] b. False

19 Pre-job safety meeting must be held prior to starting work or undertaking a hazardous or potentially hazardous activity:

- [x] a. True
- [ ] b. False

20 Personal Protective Equipment requirements are:

- [ ] a. ANSI or CSA approved hard hats.
- [ ] b. Appropriate CSA approved safety-toed boots.
- [ ] c. Fire retardant outer work wear (including hoods) with reflective stripes
- [x] d. All of the above

FIELD SAFETY ORIENTATION
INTRODUCTION

Name: _____ Date: _____

Company: _____ Phone: _____

PLEASE COMPLETE BY CHECKING OFF THE CORRECT ANSWER PER QUESTION.

1 The Site Specific Orientation must be completed prior to commencing work.
- ☐ a. True
- ☐ b. False

2 A Level 3 Orientation outlines your safety responsibilities.
- ☐ a. True
- ☐ b. False

3 It is your responsibility to stop work if there are unsafe actions or conditions.
- ☐ a. True
- ☐ b. False

4 Harvest has 10 Key Principles for all work activities on all Harvest work sites.
- ☐ a. True
- ☐ b. False

5 A properly completed Site Specific Orientation is all that needs to be done prior to work commencing to guarantee that a workplace is safe.
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- ☐ b. False

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- ☐ b. H2S Alive
- ☐ c. WHMIS and TDG
- ☐ d. All of the above

7 Which of the following is part of the Emergency Response First Steps:
- ☐ a. Contact On Site Supervisor
- ☐ b. Assess the hazards
- ☐ c. Put out the fire
- ☐ d. Call family members

8 Designated Ground Disturbance Supervisor / alternate should have 3rd party training certification (Level 2) and Harvest Operations Corp. Ground Disturbance Code of Practice training.
- ☐ a. True
- ☐ b. False

9 Cheater cords are not routine equipment and must be used under the direction of a Hot Work Permit.
- ☐ a. True
- ☐ b. False

10 Personnel must be aware and understand the scope of the job, perform a Hazard Assessment and implement controls before work starts.
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- ☐ b. False

11 Workers taking prescribed or over-the-counter medication should notify their supervisor in case of side effects.

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- ☐ b. False

12 Which type of events must be reported:

- ☐ a. Injury
- ☐ b. Hazards
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13 Beards, moustaches or excessive facial hair that may prevent a proper facial seal, are prohibited where the use of respiratory protective equipment may be required.

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- ☐ b. False

14 Environmental Controls must not be identified prior to starting work activities and workers need not be aware of controls including waste management issues (handling, storage, disposal, NORM's) Spill Mitigation (drip trays, containment).

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16 If the job scope or conditions change, or there is an emergency, work can carry on without stopping and reassessing as long as nobody appears to be in immediate danger.

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- ☐ b. False

17 One of your responsibilities is to report accidents, potential hazards and any environmental concerns to your immediate supervisor.

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18 All workers must be familiar with the location of the first aid kits, eyewash stations, emergency showers, fire extinguishers and respiratory breathing equipment.

- ☐ a. True
- ☐ b. False

19 Pre-job safety meeting must be held prior to starting work or undertaking a hazardous or potentially hazardous activity:

- ☐ a. True
- ☐ b. False

20 Personal Protective Equipment requirements are:

- ☐ a. ANSI or CSA approved hard hats.
- ☐ b. Appropriate CSA approved safety-toed boots.
- ☐ c. Fire retardant outer work wear (including hoods) with reflective stripes
- ☐ d. All of the above

Harvest Operations Corp. **Fire and Explosion Prevention Plan** (#### Pre-printed)

Attach to Safe Work Agreement

Date:	Safe Work Agreement #:
Prepared by:	Cell #:

(IS = Issuer RE = Receiver)

	IS	RE	N/A	Initials		IS	RE	N/A	Initials
Fire Extinguishers	☐	☐	☐		Welding Curtains / Blankets	☐	☐	☐	
Fire Watch	☐	☐	☐		Wetting Surrounding Area	☐	☐	☐	
Fire Eyes	☐	☐	☐		Pyrophoric Material is kept Wet	☐	☐	☐	
By-Passing Safety Devices	☐	☐	☐		Fuel Source(s) Eliminated	☐	☐	☐	
Sumps / Drains Covered	☐	☐	☐		Oxygen Source(s) Eliminated	☐	☐	☐	
Water / Steam Hose	☐	☐	☐		Other, Specify:	☐	☐	☐	
Means of Directing Sparks	☐	☐	☐		Other, Specify	☐	☐	☐	

Atmospheric	Oxygen	LEL	Toxic Gas / Substance	Substance Tested	Time	**Testers Signature**
1st Test	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			
Retest	%	%	PPM			

Critical Risks

Energy (Ignition) Source(s):	**Control Measures to Prevent Ignition**	**Person Responsible**
Oxygen (Air) Source(s):	**Control Measures to Prevent Ignition**	**Person Responsible**
Fuel Source(s):	**Control Measures to Prevent Ignition**	**Person Responsible**

Emergency Control Measures (e.g., ESD's, isolation points, fire suppression systems, etc.)

Comments:

Approval

Harvest Rep Signature: _____ **Worksite Sup Signature:** _____

Feb 26, 2015

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Risk Assessment Steps

Step 1 Determine Severity

		Category			
		People	**Environment**	**Financial**	**Public**
Severity Rating	**High**	Lost Time Injury, permanent disability or Fatality	Major impact to streams, groundwater, etc. reportable to regulators	Damage or loss $500K or more, Downtime 1 month or more	National attention. Injury or serious threat to public: shelter in place or evacuation of multiple residences
	Medium	Medical treatment or restricted duty	Off lease or with adverse affect. Reportable to Regulators	Loss between $50K - $500K, Down time 1 week to 1 month	Provincial attention. Warnings issued to public, shelter in place or evacuation of one residence
	Low	First Aid Injury	On lease but reportable to regulators	Damage or loss from $1000 to $50K, down time 1 day to a week	Local concern or complaint from public
	Negligible	No foreseeable injury	On lease release but not reportable to regulators	Damage or loss up to $1000 , down time less than 1 day	No impact to public

Step 2 Determine Probability

Remote	**Occasional**	**Probable**	**Frequent**
Not expected to occur in life of facility. Isolated occurrences in industry	Possibility of rare incidents, 1-3 occurrences in life of facility	Likely to occur several times in life of facility. One occurrence in subject facility in 3 years	Repeated occurrences expected. One or more occurrences per year

Step 3 Determine Risk

		Probability			
		Remote	**Occasional**	**Probable**	**Frequent**
Severity Rating	**High**				
	Medium				
	Low				
	Negligible				

Step 4 Assign risk ranking

	Unacceptable – Cannot accept this risk. Stop activities immediately until hazard controls are implemented to reduce risk to a low level.
	Medium – Must implement hazard controls to reduce hazard to a low level.
	Low – Some hazard controls may still be justified.

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Hazard Assessment and Risk Control Steps

1. Task (What are we doing):				**2.** Do we have the authority to proceed? (Yes or No): If no, Get permission				
Work To Be Conducted By (Who is doing the work):								
3. Do we have the necessary expertise to complete the task? Yes or No				If No, who else needs to be consulted:				
Tools, Equipment, Materials Required:				Additional PPE Required			Other considerations	
4. Sequence of Steps (How are we going to do this?)	**5.** Potential Hazards (How could we get hurt?)	**6.** Risk Rank each hazard Low, Mediuum or Unacceptable. Use the risk matrix to determine.	**7.** Current Hazard Control(s) (What is protecting us?)	**8.** Is Control Adequate? (Y or N)	**9.** Description of Additional/Required Control	**10.** Controls To Be Implemented By (name)		

Steps in conducting a hazard assessment.

Prior to conducting any work, ask the following questions:

1. What are we doing?
2. Do we have the authority to do this work?
3. Do we have the right people and equipment to do the job?
4. How are we going to do this?
5. How could we get hurt?
6. Determine Risk (How bad could it be and what's the probability?)
7. What hazard controls are in place?
8. Are the controls adequate?
9. What other hazard controls do we need?
10. Who is going to implement these controls?

In every case, before conducting any work

Review the Harvest 10 Key Principles

1. Identify the Harvest Operating Authority
2. Acquire authority to proceed with work
3. Identify and document names of Worksite Supervisor & alternate
4. Identify scope of work, list tasks, (stop work if scope changes)
5. Assess competency for the tasks at hand
6. Identify hazards (including those related to concurrent work) and assess risk
7. Identify risk controls and assign any required actions
8. Ensure compliance with regulations
9. Plan Site Emergency Response (contacts, muster areas, etc)
10. Review with all workers and document

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Control Safety Zone Analysis

1 **Determine area forest fire rating (reference SRD)** http://srd.alberta.ca/Wildfire/WildfireStatus/Default.aspx

2 **Confirm fire location with SRD (or local resources)**

3 **Confirm Fire status with SRD (or local resources)**

4 **Identify nearest personnel and assets**

5 **Determine safety zones on chart below.**

6 **Gather most recent weather facts for area (past 24 hr and forecast for next 24hrs including temperature, wind speeds, relative humidity, precipitation in last 24 hrs)**

http://www.weatheroffice.gc.ca/city/pages/ab-40_metric_e.html

7 **Risk assess exposures prior to having workers re-enter area**

Forestry Fire Rating

Current Fire Status	Poor	Fair	Low	Moderate	High	Extreme
Out of Control	6 km	6 km	12 km	18 km	20 km	24 km
Being Held	3 km	3 km	6 km	12 km	15 km	18 km
Under Control	<1 km	3 km	3 km	6 km	9 km	12 km
Turned Over	<1 km	<1 km	3 km	3 km	4.5 km	6 km

Danger Zones (EPZ)

ERP Template						
Manpower resources in area						
# of Multi-well batteries to shut in						
# of Compressors to shut in						
# of Flow line wells to shut in						
# of SWB to shut in						
Access restrictions						
Assess vegetation classification						

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Risk Controls	

References

Vegetation Classification Chart

Species	Flammability	Fuel Type
Black Spruce	Extreme	C2
Cured/dead grass and slash	Extreme	O1,S1,S2,S3
Lodgepole or jack pine	High	C3
White spruce	High	M1,M2
Western Larch	Low	C1
Young and mature aspen (has clean forest floor present)	Very Low	D1

Ref. FireSmart-Guide-OilAndGasIndustry-2008pdf

http://srd.alberta.ca/Wildfire/FireSmartIndustry/Default.aspx

How fast do forest fires burn?

Most forest fires advance at a rate of less than 0.5 km/h, and few spread faster than 1 km/h. The fastest forest fires can burn at 6

The speed that a fire burns depends on the type of trees and the amount of moisture in the forest. Coniferous (evergreen) trees burn

http://fire.cfs.nrcan.gc.ca/questions-fire-feu-eng.php

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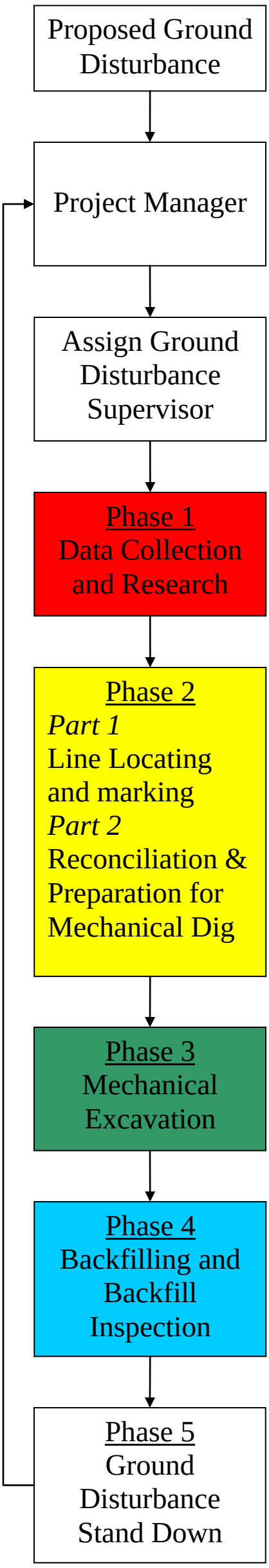
Ground Disturbance Process Chart



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Harvest Operations Corp. Ground Disturbance Checklist (#### Pre-printed)

This Ground Disturbance checklist must be completed for all Ground Disturbance activities. Refer to the Ground Disturbance Code of Practice.

Date:	Location (LSD):	
Project Manager:	Cell #:	
Ground Disturbance Supervisor:	Cell #:	Company:
Ground Disturbance Supervisor (Alt):	Cell #:	Company:
Operating Authority:	Cell #:	
Contractor Representative:	Cell #:	Company:

Scope of Work:

If the work scope and/or conditions change, work must stop and the hazards reassessed before work continues.

Any answers checked off "no" must have a comment written

Phase 1 – Data Collection and Research				
	Y	**N**	**Initial**	**Comments**
Call One-Call and record ticket number (48 hrs notice)	☐			
Have you identified and contacted other companies not on One-Call? (48 hrs notice)	☐	☐		
Obtained / Reviewed surveys, drawings, past files?	☐	☐		
Obtained / Reviewed land titles certificate?	☐	☐		
Obtained / Reviewed Regulatory approvals and other applicable pipeline/facility info?	☐	☐		
Completed Pipeline & Facilities Record Sheet?	☐	☐		
Have foreign line size, MOP and substances been identified?	☐	☐		
Obtained / Reviewed necessary crossing agreements?	☐	☐		
Notification to necessary landowner/municipality?	☐	☐		
Obtained/Reviewed Utilities maps e.g., Gas CO-OP's, phone	☐	☐		
Have you obtained a turn over agreement from the Operating Authority?	☐	☐		

Phase 2				
Part 1 - Line Locating and Marking	**Y**	**N**	**Initial**	**Comments**
Have all U/G facilities been located, marked, & mapped?	☐	☐		
Have all U/G utility owner(s) provided a written inspection report?	☐	☐		
Searched for visible signs of underground facilities?	☐			
Searched dig area for marker / identification signs?	☐			
Has the search package from line locators been received?	☐			
Part 2 - Reconciliation and Prep for Mechanical Dig	☐			
Is the Designated Ground Disturbance Supervisor on-site?	☐			
Is applicable documentation, drawings available on site?	☐			
Have you verified that the equip operator, the spotter and those supervising G/D have the appropriate G/D certification?	☐			
Have all personnel involved in G/D received an on-site review of the HOC G/D COP?	☐			
Completed the Site Specific Emergency Response Plan?	☐			
Determined if work will undermine structures or foundations?	☐	☐		
Are any existing operating pipelines to be exposed in excess of 4m "in length"?	☐	☐		
If "yes" the line must be depressurized or an authenticated engineering assessment and risk analysis must be completed and followed.				
Has the authenticated engineering assessment and risk analysis been completed and available on location?	☐	☐		
Have all U/G facilities been reconciled?	☐	☐		
If "no" refer to Phase 2 - Part 1 HOC G/D COP.				
Are there are U/G facilities within the 5m dig zone?	☐	☐		
If "yes" U/G facilities MUST be hand exposed.				
Identified and know where the isolation points are?	☐	☐		
If it is necessary to isolate refer to the Energy Isolation SOP, section Lockout – Tagout	☐			
Identified overhead power lines (OHPL)?	☐	☐		
If above is "yes" complete the "working in proximity to OHPL" form	☐			
Will the project involve work in a Confined Space?	☐	☐		
If above is "yes" refer to the Harvest Operations Corp. confined space COP.	☐			

Approval

Project Manager Signature:		**Date**	
Ground Disturbance Supervisor Signature:		**Date**	
HOC Operating Authority Signature:		**Date**	
Contractor Representative Signature:		**Date**	

Phase 1 and 2 MUST be completed prior to progressing to Phase 3

Phase 3 - Mechanical Excavation	
Considerations to be addressed and documented on safe work agreement and the pre-job safety meetings.	**Comments**
Spoil pile area established 1-m from edge of excavation	
A competent signal / spotter person may be required for excavation in accordance with the ground disturbance Code of Practice.	
Barricades and signage must be available and in place, if required.	
Proper shoring and bracing must been installed, if required. (reference OHS Code)	
Have means of access/egress been established?	

Phase 4 - Backfilling and Backfill Inspections	
	Comments
Complete Pipeline Assessment Record, including pictures, as-builts, etc.	
Ensure foreign owners are notified 24 hours before backfilling.	

Phase 5 - Ground Disturbance Stand-Down: Record Keeping	
	Comments
All documentation associated with GD must be submitted to the Project Manager	

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H_2S TASK EVALUATION

Location: _____ Evaluated by: _____

TASK	MAX H_2S CONC. IN EQUIP.	POTENTIAL EXPOSURE TO OVER 10 PPM H_2S	PERSONAL MONITOR REQUIRED	H_2S TEST DEVICE REQ'D	SCBA SABA WORN	BACKUP METHOD IF REQUIRED	RADIO OR MOBILE REQ'D	COMMENTS

POTENTIAL EXPOSURE

LIKELY - H_2S exposure limit likely to be exceeded during the task.

UNLIKELY - H_2S exposure limit not likely to be exceeded unless an abnormality occurs during the task.

REMOTE - Concentration and potential release rate of H_2S is low enough that H_2S exposure limit in the breathing zone is extremely unlikely to be exceeded.

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Hazard Identification

HOC Emergency #: 1-403-888-2540

Date Reported:	**Location:**	**Date Occurred:**
Reported By:	☐ Contractor company name (direct):	
☐ Harvest Employee	Subcontractor - Yes ☐ No ☐	If yes, write company name:

Functional Group(s)

☐ Drilling	☐ Construction	☐ Other:
☐ Facilities	☐ Environmental	
☐ Operations	☐ Well Servicing / Completions	

Hazard Description:

Immediate / Corrective Actions:	**Date Completed**

Suggestive Actions:

Risk Assessment

Loss Severity Potential	☐ Low	☐ Medium	☐ High	☐ Unacceptable
Probability of Recurrence:	☐ Remote	☐ Possible	☐ Probable	☐ Expected

Assigned Risk Ranking:
*Refer to Harvest Risk Matrix

Individuals Notified: (use additional sheet if needed)

Name (print):	**Signature**	**Name (print):**	**Signature**

Reviewed By:

Name (print):	**Position:**	**Signature:**	**Date:**

Submit completed form to EHS@harvestenergy.ca

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FACILITY INSPECTION CHECKLIST - DETAILED
(Regulatory, Health, Safety & Environment)

Purpose: *To ensure that a consistent level of safety, emergency preparedness, hazard identification and regulatory compliance is achieved in all areas.*

Plant/Battery Name: _____ **Location (LSD):** _____ **Inspection Date:** _____ **Inspected By:** _____

Type of Facility: ☐ **Sweet** ☐ **Sour** ☐ **Gas Gathering System** ☐ **Gas Processing Plant** ☐ **Oil Battery (S or M)** ☐ **Satellite**

Operation At Time of Inspection: ☐ **Operating** ☐ **Shut in** ☐ **Other (identify)** _____

Type of Inspection: ☐ **Initial Inspection** ☐ **Follow-up Review** ☐ **Pre-startup Inspection** ☐ **General** ☐ **Other** _____

Are Adequate Controls in Place to Meet Reg's? (in all cases)

	PERFORMANCE MEASURES	Evaluated	Deficient	Corrective Action Required	Risk Rating	Person Responsible	Target Date	Completed Date
A	**Regulatory / Environmental**							
1.	**Acid Gas** (Temperature recording, Measurement, Air monitoring, Stack Top Temperature, Dilution gas, No wind guard)							
2.	**Chart Drive/Dri-Flo** (Calibrated, Pens inking / painting, Proper speed / pressure, Chart info correct, Properly zeroed, Chart temperature recorded, Proper charts, Proper orifice size, Card/tag at meter, Liquid traps in lines, Correct static elements, etc)							
3.	**Compressor Installation** (Converter, Exhaust height, Approvals current, Spacing, Noise suppression)							
4.	**Drain System** (Lines tied into tankage, Plugged, Into pit, Onto ground**, Floor drains kept empty and clean)**							
5.	**Emergency Response Plans** (Plan available, Training, Exercises, Current [annually], Resident Visits, Wind Indicator)							
6.	**Emergency Shutdowns** (Calibrated, Function tested, Water body's, Subsurface, Surface, Spec's)							
7.	**Emissions Noise** (Adjacent landowners, Exceeding permissible levels, Complaints)							
8.	**Emissions Odours** (Excessive vapours, H_2S, SO_2, Hydrocarbon off lease, Glycol regenerators, Pits/ponds odours, Sour fuel gas, Stack height, Public complaints, Storage tanks venting, Incomplete combustion, Checked / Tracking, Continuous igniter, Windguard, Dispersion modeling, etc)							
9.	**Emissions Smoke** (Public complaints, Not controlled, Excessive, Not being investigated)							

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10.	**Flare System** (Knockout drum size / location / pump out or high level SD, Alarms/Shutdowns, Flare gun used in green area, Venting, No wind guard for acid gas, Relief valves not tied into flare system, Ignition device not operable, Stack height not adequate)							
11.	**Flare/Vent Gas** (Excess flaring, Reporting / estimating not accurate, Flared volumes not documented/logged, Tank vapours calculated properly)							
12.	**Fuel Gas** (Dilution gas, Estimating not accurate, Tap locations upstream of meter run, Measurement not as approved, Plant fuel gas not measured, etc)							
13.	**Housekeeping** (Neat, Orderly, Marked, Clean, Staining, Vegetation controlled, Drip barrels, Garbage / Debris contained/removed, Lines plugged/capped)							
14.	**Measurement** (Inlet not measured, No test meter, Group not measured, New technology not approved, Test & group press's diff by >200 kPa, Trucked in fluids estimated, Inaccurate BS&W measurement, Water cut proc's inaccurate, No water meter off treater, Disposal metering/balance, Tap locations, Meter factors current, GOR testing annually, etc)							
15.	**Meters** (Calibrations proper/current, Operating as per manuf & OGC spec's, Not meeting AGA 3 specs, Card/tag at meter, Not operating or not properly in service, Subject to excessive pulsation or surging, transmitters below orifice changer / within 3 meters of orifice, Bypass valve open, etc)							
16.	**Orifice Plates** (Leaks/seized, Liquid traps to meter, Changer inoperable, Improper size, Plate damaged, Not properly stored, etc							
17.	**Other ERCB Compliance Requirements** (Construction, Approvals, Flaring Practice, Gas Conservation, Notifications, Equipment / Wells properly suspended, Corrosion program, Monitoring wells sampled, Sulphur handling, Quality Assurance Program, Reference Documentation)							
18.	**Other** (AENV approval or code of practice, Reporting or monitoring requirements, Reporting deadlines met, Piezometers / recovery systems on lease, Ground water monitoring / sampling, Air monitoring, NPRI questionnaire completed / submitted, Reported quantities of specified and toxic substances)							
19.	**Pits** (Inventory, Disposal unsatisfactory, Release / Disposal records, Fluids present, In use, Construction unsatisfactory, No flow shut off, Garbage)							
20.	**Plant** (Inlet condensate / gas recycle line locations correct, Emission rates, Inlet measurement, CSEM [Continuous Stack Emissions Monitor], Stack surveys, Stack top temp, etc)							

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21.	**Pop Tanks** (Sensing devices, Lines not self draining, Capacity, Termination, Fluids in tank, PSV's, Tank type, Isolation valves)							
22.	**Signage / Security** (ID sign [owner name, LSD, TDG label, phone #], Hazard signs re sour / sweet, Fencing as per ERCB, Wind Indicator)							
23.	**Spacing** (Tanks, Well, Flame, Flare, Engines, Process vessels, PSV's, Burner air location, etc)							
24.	**Spills** (Notification, Un-addressed, Reporting, Water bodies, Not properly cleaned up, Reclamation projects Requirements posted, etc)							
25.	**Storage Requirements** (AST / UST, Approvals, Integrity records monthly, Coating, Impervious liners, Bulk pads, Identification, Diking [concrete dykes], Secondary containment, Weather protection, Liner checks, Capacity's, Leak detection records, Monitoring, Process water, Produced Water, Sanitary sewage, Solid waste, Sulphur, Truck loading, LPG/NGL vessels meet code, Materials onsite over 2 yr's, Next to water source, Dike integrity, etc)							
26.	**Storage / Stacking** (tools, parts, supplies, paint, barrels – full/empty)							
27.	**Surface Runoff Control** (Disposal unsatisfactory, Within 100m of water body, Diking, Sterilants, Analysis / Water release records, Landowner notification / approval)							
28.	**System (Measurement)** (Not as follows [separator-meter-dump valve-prover taps], Dump valve not snap acting, Dump valve leaking, Flow rate not as per manuf spec's, Relief valves not tied into flare system, etc)							
29.	**Tanks / Storage** (D-55 Compliant [UST / AST] Inspections current, Gauging inaccurate, Dike integrity, Dike size correct, Loading areas, No leak detection, Auto gauges, Ladders compliant, Leaking, Corrosion, **Floor drains not being used as storage, No Buried barrels being used)**							
30.	**Vapour Recovery** (Inadequate, Inoperable, Vapours vented/flared, Lines not freeze protected,)							
31.	**Waste Management** (Disposal compliant, Manifesting records complete/available, Waste tracking / inventory records, Unapproved facility, Identification of waste, Records [2 yr's], Containment, Segregation, Storage not adequate, Storage over 3 months &/or 1 yr, Land treatment site, Containers not suitable, Not adequately fenced, Storage bins, Segregated, Lids)							
B	**Jobsite Conditions**							
1.	**Air Quality** (odours, venting, flaring, instruments vented outside, welding areas, labs, exhaust fans, etc)							

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2.	**Chemicals** (handling & storage, labeled, adequate controls in place)							
3.	**Compressed Gas Cylinders** (secured, labeled, segregated, ventilated)							
4.	**Doorways** (clear, panic hardware, exit signs, overhead protection in place i.e. roof rakes, canopies)							
5.	**Fences** (is site secure, compliant with Reg's, pits/sumps, etc)							
6.	**Ladders** (rungs, tie-offs, feet, safety hoops, platforms, storage)							
7.	**Lighting** (adequate for work activity, working)							
8.	**Loading Areas** (signs, chalks, bonds, caps, containment)							
9.	**Overhead / Underground Hazards** (identified, marked, etc)							
10.	**Piping/ Pipeline Risers/ Equipment Barriers** (Load areas, pipeline risers, electrical equipment, pipe supports, etc)							
11.	**Stairways / Hallways/Aisles** (clear, hand rails, full steps, unobstructed)							
12.	**Work Platforms / Scaffolding** (toe boards, railings, secured, safety chains, not corroded or badly rusted)							
13.	**Working / Walking Surfaces** (floors, benches, grating, ruts, slipping hazards)							
C	**Equipment**							
1.	**Cathodic Protection** (settings okay, lines connected, power on, tanks not protected, out of service, records, etc)							
2.	**Electrical Systems** (labeled, covers, cords, cheaters, grounds, bonds, weather protected, connections tight)							
3.	**Equipment Operation** (within design limits, safety shutdown blocked, etc)							
4.	**Gauges** (functional, valves under, tank boards working, etc)							
5.	**Hand / Power Tools** (condition, guards, stored properly, etc.)							
6.	**Heaters** (explosion proof, safety shut off in service, operable, etc)							
7.	**Hoses** (used for correct purposes, frayed, kinked, peeling, proper ends for hose rating)							
8.	**Lifting Equipment** (slings, cranes, logs, labeled, operator certificates) (Verify that certified equipment inspections have been completed)							

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9.	**Mechanical Systems** (air, power, hydraulic, corrosion, vibration, calibration, isolation, etc)							
10.	**Mobile Equipment** (pre-use checklists / inspections)							
11.	**Pigging Systems** (caps, threads, safety valves, chains, containment, wrenches being used, etc), inspection records,							
12.	**Piping Systems** (leaks, corrosion, accessible, covered, stressed, bull plugs, bolting, etc)							
13.	**PM Program** (current, wall chart being utilized, actual records available)							
14.	**PSV's** (isolation valves, seals, correct rating, correct location, inspected, vented outside, car seal records)							
D	**Environment / Industrial Hygiene**							
1.	**Audiometric Testing** (survey conducted, controls implemented, etc)							
2.	**Dykes / Berms** (lined, condition, vegetation, empty, drains removed, correct size)							
3.	**Benzene** (survey conducted, controls in place, etc)							
4.	**Environmental** (leaks, spills, black smoke, stains, sheens on surface water, etc)							
5.	**Insulation** (covered, protected, identified as to type [i.e. asbestos])							
6.	**Noise** (survey conducted, controls implemented, signs posted, etc)							
7.	**NORM's** (survey conducted, controls implemented, contaminated sites identified, etc)							
8.	**Secondary Containment** (barrels, tanks, compressors, etc)							
9.	**Vegetation** (managed [weed control], stressed on/off lease)							
10.	**Ventilation** (adequate, fume hoods in place, vented outside)							
E	**Personal Protection / Controls**							
1.	**Bonding** (for metal pails, load lines in place & used)							
2.	**Engineering Controls** (isolation, shielding, substitution, enclosure, etc)							
3.	**Ergonomics** (work stations, valve placement, etc)							
4.	**Eye Protection** (safety eyeglasses, goggles, face shields)							
5.	**Fall Protection** (lanyards, tied off, shock arrests, climbing devices, etc)							

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6.	**Foot / Hand Protection** (as per standard, appropriate for conditions)							
7.	**FRC** (hot / live areas, excavating lines, clean, etc)							
8.	**Ground Disturbance** (checklist utilized. completed properly, records)							
9.	**Grounding** (tanks, vessels, bldgs, load lines, etc)							
10.	**Guards / Barriers** (couplings, belts, gears, pulleys, flywheels, pits, exhaust, sight glasses, crank arms, risers, guy lines, overhead piping**, vehicle contact etc)**							
11.	**Head / Hearing Protection** (scratches/dents, clean, applicable, proper NRR)							
12.	**Lock-out / Zero Energy** (procedure available, utilized, tags signed, keys securely stored, etc)							
13.	**Noise Controls** (silencers, baffles, barricades, blankets, etc)							
14.	**Orientations General** (current, all employees / consultants / contractors, records available)							
15.	**Respiratory Protection** (respirators, SCBA, fit testing records)							
16.	**Safe Work Agreements** (completed properly, current, records maintained)							
17.	**Training Safety** (current, records available)							
18.	**Visitor Orientation Posted, Being Utilized** (Sign in sheet used, alarm systems described, etc)							
19.	**Work Practices/Procedures/Rules/Blind Lists** (at site, critical task list, jsa's, understood, utilized)							
F	**Emergency Preparedness**							
1.	**Alarm Systems** (horns, fire, LEL, H_2S, etc.)							
2.	**Communication Systems** (radios, mobiles, phones)							
3.	**Emergency Equipment** (stretchers, blankets, generators, ETV's, location)							
4.	**Emergency Instructions / ERP** (posted, available & current)							
5.	**Emergency Shutdowns** (hi/lo switches operational, calibrated, records, valves not blocked, etc)							
6.	**Eye Wash / Shower Stations** (accessible, maintained, records, location)							
7.	**Fire Protection** (ext. inspections current, hydrants, monitors, location)							

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8.	**First Aid Supply** (inventoried, no medications, reviewed)							
9.	**SDS's Available** (posted by hazardous product, current list & sds's)							
10.	**Phone Lists** (visibly posted, current)							
11.	**Vehicles** (regularly inspected, properly maintained, records available, parked for easy / safe egress)							
12.	**Windsocks / Warning Lights** (visible, unobstructed, tattered, etc)							
G	**Labels / Signs**							
1.	**Environment, Health, &Safety Policy Posted** (current date & signatures)							
2.	**ESD Signs / Markers** (easily visible, protected)							
3.	**First Aid Locations** (well identified, sufficient for site)							
4.	**Hazard Signs** (auto start signs, hearing protection, no smoking, H_2S, light hydrocarbons, flammable, etc)							
5.	**TDG Signs** (appropriate for product, on tanks, lease signs)							
6.	**WHMIS Tags / Labels** (piping, containers, vessels, etc)							

The numbers in Red & Shaded mean there should be paper work available and filed.

SCORE CALCULATION: Total E (evaluated) _____ Total D (deficient) _____ Total E minus Total D = _____ Compliant
Total Compliant _____ Divided by Total E _____ x 100 = _____ % Compliance

RISK RANKING: Each deficiency shall be assigned a risk ranking of Unacceptable, Medium or Low according to the risk assessment steps shown below.

REVIEWED BY: _____

RISK ASSESSMENT STEPS

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FACILITY PRE-STARTUP INSPECTION CHECKLIST

PROJECT NAME: _____

Area: _____ Location: _____

Operations Rep: _____ Date: _____

Facilities Rep: _____ Sweet or Sour _____

EHS Advisor: _____ Photos (Y/N) _____

Type of Facility (swb, sat, bty, comp, dehy, plant, etc) _____

A	SAFETY / EMERGENCY SYSTEMS (Is / Are)	YES	NO	N/A
1.	climbing devices adequate, i.e. fall protection, platforms, gates, etc?			
2.	electrical equipment requirements met re classification?			
3.	fire extinguishers, of the proper type available & sufficient (records)?			
4.	first aid, eyewash stations, etc available & sufficient?			
5.	handrails and guardrails proper & installed where needed?			
6.	hazard warning signs such as hearing protection, chemicals, eye protection, auto start, high temperatures, overhead/underground lines, WHMIS labeling/marking, etc, in place & adequate?			
7.	lighting adequate (100 or 12 volt, emergency power available)?			
8.	monitoring equipment available / checked (e.g. LEL, H_2S, Fire, etc)?			
9.	safe operating limits clearly marked on gauges and controls?			
10.	sources of static electricity addressed through grounding or bonding?			
11.	special PPE requirements available (rubber suits, goggles, face shields, etc)?			
12.	switches properly labeled (e.g. – Hand / Off / Auto)?			
13.	tag out / lock out equipment in place & compliant?			
14.	vapors, fumes, mists, noise, chemicals, etc. identified & addressed?			
15.	walking and working areas free from slipping / tripping hazards?			
B	**MECHANICAL SYSTEMS (Is / Are)**			
1.	blinding/isolation adequate, possible for repairs & turnarounds?			
2.	critical parts identified, available?			
3.	equipment or process safe if air, electricity, steam or vacuum fails (fail safe)?			
4.	gauges properly located, ranged and legible?			
5.	heaters accessible, safety shut off's operable, wired properly?			
6.	lifting devices proper, available, labeled, certified (e.g. for handling barrels)?			
7.	metering adequate (meets D-64 requirements)?			
8.	maintenance access been provided, adequate?			
9.	moving parts, hot equipment and pinch points adequately guarded?			
10.	noise abatement addressed for workers and landowners?			
11.	piping adequate for service (temperature, sour service, hoses, etc)?			
12.	potential gas vents (regulators, controllers, etc), vented outside?			
13.	pressure (internal) released when system is ESD'd?			

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		YES	NO	N/A
14.	pressure, temperature, vibration, level protection adequate, properly ranged, functioning?			
15.	pressure testing (including pre-test) and leak check of systems complete?			
16.	purging procedure/plan available, who's responsible?			
17.	relief devices (PSV's, PCV's) adequate & correctly set?			
18.	relief ports, blowouts and vents, directed so that discharge does not present a hazard?			
19.	remote shut downs (ESD Stn's) installed as required?			
20.	rotating parts checked for balance / alignment?			
21.	shutdown key functional, available?			
22.	special tools available, if required?			
23.	valves accessible or chains / platforms installed?			
24.	valves properly lined up (closed or open), as per P&ID?			
C	**ENVIRONMENTAL CONTROL / COMPLIANCE (Is / Are)**			
1.	dykes / berms adequate as per regulations?			
2.	D-64, D-60, D-55 requirements met?			
3.	regulations regarding storage, handling and disposal (D-55, D-58, etc) complied with?			
4.	safeguards / equipment available & adequate in the event of a major spill or exposure?			
D	**PROCEDURES / OPERATIONS MATERIAL (Is / Are)**			
1.	drawings, current, as builts, plot plans, on site and reviewed?			
2.	equipment added to OIP program?			
3.	equipment added to PM program?			
4.	facility license on site?			
5.	forms such as Safe Work Agreement, Confined Space Entry Attachment, Near Miss/Hazard Identification, Waste Manifests, Equipment Logs, Production Records, etc on site?			
6.	lines added to pipeline operations & maintenance manual?			
7.	operating / maintenance procedures manuals on site?			
8.	personnel properly oriented, trained on equipment operation and maintenance, including emergency procedures?			
E	**OTHER POTENTIAL HAZARDS / DEFICIENCIES IDENTIFIED (Is / Are)**			
1.	fences adequate to keep livestock in/out and personnel protected?			

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SUBSTANDARD CONDITIONS SUMMARY AND FOLLOW-UP FOR PRE-STARTUP INSPECTIONS

LOCATION: _____ **DATE (Y-M-D)**

Rep's:

NO.	CONDITIONS/CORRECTIVE ACTION	ACTION BY: NAME	RISK RATING	TARGET DATE	COMPLETED DATE/INITIAL

PROJECT REVIEW	SIGNATURE	DATE (Y-M-D)
1st Review		
2nd Review		

Deficiencies shall be assigned a risk ranking of Unacceptable, Medium or Low using the risk assessment steps provided in Section 2, Hazard Identification, Risk Assessment and Controls of the Harvest EHS Program.

UNACCEPTABLE

Work must not proceed until hazard controls are implemented to reduce risk to a low level.

MEDIUM

Must implement hazard controls to reduce hazard to a low level.

LOW

Some hazard controls may still be justified.

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FIELD RECORDS MANAGEMENT

AREA: _____ **LOCATION:** _____

			Check List	Information	Required By:	Years to keep files
REQUIRED TO BE POSTED						
1.		Corporate HSE Policy		Field Office	Harvest	Perm
2.		Facility Licenses/Approvals		Field Office	ERCB / AEP	Perm
3.		PM Schedule		Field Office	Harvest	Perm
4.		Visitor Orientation & Sign in Sheet		Field Office	Harvest	1
5.		Emergency first steps list and Emergency Contacts		Field Office	OH&S	Perm
6.		Initial Spill Response wall chart		Field Office	Harvest	Perm
7.		Preventive Maintenance Schedule unless in Roughneck		Field Office	Harvest	Perm
MANUALS REQUIRED						
1.		Corporate ERP		HOC Intranet/EH&S/Corporate ERP	ERCB Dir - 71	Perm
2.		Facility ERP		Harvest Vehicles	ERCB DIR - 71	Perm
3.		Harvest Health & Safety Manual		Harvest Vehicles	OH&S & Harvest	Perm
4.		Harvest Pipeline Manual		HOC Intranet/asset integrity	ERCB & Harvest	Perm
5.		Workplace Health & Safety Reg's Manual		Field Office	OH&S	Perm
6.		SDS Binder - ***Both Chemicals used and products produced at the site***		Field Office	WHMIS & Harvest	All sheets current (3 years)
7.		Electrical QMP manual				

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FILES / RECORDS REQUIRED

1.0		***Health & Safety***				
1.1		Potable Water Analysis			OH&S	Perm
1.2		Noise Level Surveys		Field Office	OH&S / ERCB	Perm
1.3		NORMS testing records		Field Office	Harvest	Perm
1.4		Monthly Safety Equipment Inspections		Field Office	Harvest	2
	1.4.1	Breathing Apparatus Monthly Inspections (SCBA&SABA)		Field Office	OH&S	2
	1.4.2	Fire Extinguisher Monthly Inspections		Field Office	Fire Code	2
	1.4.3	Eye Wash Inspection Reports		Field Office	OH&S	2
	1.4.4	First Aid Kits - Check Lists		Field Office	OH&S	2
	1.4.5	Fall arrest equipment		Field Office	OH&S	2
	1.4.6	Rescue equipment (stretchers, ropes etc.)				2
	1.4.7	Annual SCBA Fit Testing records		Field Office	OH&S	2
1.5		Employee / Contractor Records		Canadian HSE Registry on internet https://vm1.canadahse.com/login.php	Harvest	Perm
	1.5.1	Orientations – Employee/Contract Operator		Field Office	Harvest	2
	1.5.2	Worker Orientations -(Include Sign in Sheet)		Field Office	OH&S & Harvest	1
	1.5.3	Training & Certificates (Includes Fall Protection)		Lloyd Office	OH&S & Harvest	4
	1.5.4	Safety Meetings Minutes		S:\Health&Safety\meetings\plains E\2008	OH&S & Harvest	4
	P	First Aid Treatment & Injury Report - Personal Files		Calgary Office Human Resources	OH&S	Secured
	P	- Medical Certification Records - Personal Files		Calgary Office Human Resources	OH&S	Secured
1.6		Safe Work Agreements & Permits		Field Office	OH&S & Harvest	2
	1.6.1	Daily Safe Work Agreement hand backs		Field Office	Harvest	2
	1.6.2	Hazard Assessment/Pre-job meetings and hand back Docs.		Field Office	OH&S & Harvest	2
	1.6.3	Hazard Operability Reports		Field Office	OH&S ??	Perm
	1.6.4	Approved Contactor List		S:/Procurement, Contracts & Materials/Master Service Agreement, and Canadian HSE Registry on internet https://vm1.canadahse.com/login.php	Harvest	Perm
1.7		Confined Space Entry Permits		Field Office	OH&S & Harvest	2
1.8		Event Reports and accident investigation records		Roughneck Database	Harvest	Perm
1.9		Self Disclosures		Emails	ERCB & Harvest	2
1.10		Site Inspection Reports		S:\Health&Safety\COR\Site Inspections	ERCB ??	2
1.11		Working Alone		Field Office	OH&S	2
1.12		Critical Task List, JSA's and Work Procedure Sheets		S:\Health&Safety\COR\JSA2008	OH&S	Perm
1.13		Vehicle Inspection Reports		Field Office	Harvest	2

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2.0		***Environmental***				
2.2		Spill Reports		Roughneck Database	ERCB & Harvest	Perm
2.3		Surface Water Release Guidelines		Field Office	AB Environment	Perm
	2.3.1	Surface Water Release Records & Volumes		Field Office	ERCB D-55 sec 11	5
	2.3.2	Surface Water Field Test Results		Field Office	ERCB D-55 sec 11	5
2.5		Waste Management / Guidelines		Field Office	ERCB D-55 & D-58	Perm
	2.5.1	Waste Management & Chemical Records (Manifests)		Field Office	ERCB D-55 & D-58	2
2.6		Resident Complaints		Roughneck Database	Harvest & ERCB	Perm
2.7		Hazardous Materials Inventory		Field Office	OH&S	Perm
2.8		Weed Management		Field Office	ERCB & Forestry	Perm
2.9		Odour Monitoring check sheets		DPR	ERCB & Harvest	2
2.10		Fugitive Emissions Reports		S:\Health&Safety\Odour Tracking	ERCB & Harvest	2

3.0		***Pipelines***			***ERCB Pipeline Act***	
3.1		Licenses		ERP Binders	ERCB	Perm
3.2		Maps (Showing isolation points)		ERP Binders	Harvest	Perm
3.3		Cathodic Protection		Field Office	ERCB & Harvest	Perm
	3.3.1	Annual Reports		Field Office	Harvest	Perm
	3.3.2	Repair Records		Field Office	ERCB & Harvest	Perm
	3.3.3	Monthly Rectifier Readings		Field Office	Harvest	Perm
3.4		Pipeline Crossings		Field Office	ERCB & Harvest	Perm
	3.4.1	Crossing Agreements		Field Office	ERCB & Harvest	Perm
	3.4.2	Crossing Inspections		Field Office	ERCB & Harvest	Perm
	3.4.3	Ground Disturbance Files - Training & Permits		Field Office	ERCB AR122/87	2
3.5		Monthly Pressure Switch Checks		Field Office	ERCB & Harvest	2
3.6		Quarterly interstitial vent checks for lined pipelines		Field Office	ERCB & Harvest	Perm
3.7		Annual ROW Inspections		Field Office	ERCB & Harvest	Perm
3.8		Annual Pipeline Sign Inspections		Field Office	ERCB & Harvest	2
3.9		Pipeline Failure Reports		Field Office	ERCB & Harvest	Perm
	3.9.1	Repair Reports		Field Office	ERCB & Harvest	Perm
	3.9.2	Suspended pipeline inspections		Field Office	ERCB & Harvest	2

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4.0		***Vessels & Tanks***			ERCB D-58	
4.1		Vessel & PSV Inventory		RAE Engineering Database	Harvest	Perm
4.2		Individual Vessel / PSV Data & Inspection Files		Field Office	ABSA & Harvest	Perm
4.3		PSV Block Valve / Carseal Inspections		Field Office	ABSA & Harvest	5
4.4		Tankage		Field Office	ERCB D-55 Sec 10	5
	4.4.1	Monthly Visual Tank & Berm Inspections		Field Office	ERCB D-55 Sec 10	6
	4.4.2	Monthly Monitoring of Double Walled Tanks		Field Office	ERCB D-55 Sec 10	6
	4.4.3	Piping Corrosion Reports		Field Office	ERCB D-55 Sec 10	6
	4.4.4	Piping Inspection Reports		Field Office	ERCB D-55 Sec 10	6
4.5		Tank Inventory			Harvest	
4.7		Individual Tank Testing / Inspection Reports		RAE Engineering Database	ERCB & Harvest	6
		MOC Documentation		S:\Health&Safety\COR\ Management of change\Area Responsibility\Gary Walz		Perm
		U/T Reports		Field Office		Perm
		Boilers Branch Certificates		Field Office	ABSA & Harvest	Perm
		Harvest (ABSA) Owner User Manual		HOC Intranet/Asset Integrity	ABSA	Perm

5.0		***Operations***				
5.1		Audits / Inspections - Harvest, ERCB, Other		Field Office	ERCB D-55 &D- 64	2
5.2		ESD Function Tests (Annual) Facility & Satts.		Field Office	Harvest / Insurance	2
	5.2.1	Shutdown Device Function Tests (Quarterly)		Field Office	ERCB & Harvest	2
5.3		Flame Arrestor Inspections		Field Office	Harvest	2
5.4		Gas / Fire Detection Calibrations		Field Office	Harvest	2
5.5		Annual Overhead Crane Inspections (professional)		Field Office	OH&S	2
5.6		Monthly visual Overhead Crane inspections (operator)		Field Office	OH&S	2
5.7		Meter Calibration / Proving Reports		Field Office	ERCB	2
5.8		Flare / Venting Logs / Reports		Field Office	ERCB D-60	2
5.9		H2S / S02 Detection Record (Sour)		DPR	ERCB & Harvest	2
5.10		Plant Fuel Gas Odour Detection Records		DPR	ERCB &Harvest	2
5.11		Plant/Equipment start up procedures		S:\Health&Safety\COR\JSA 2008	Harvest	Perm
5.12		Equipment Maintenance & Log Books		Field Office	Harvest	Perm

6.0		***Wells (one file for each well)***				
6.1		Suspended Well List		Field Office	Harvest	Perm
	6.1.1	Suspended Well Inspections		Field Office	ERCB & Harvest	Perm

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JOB OBSERVATION CHECKLIST

Functional Group:
- ☐ Drilling
- ☐ Environmental
- ☐ Facility and Pipeline Construction
- ☐ Lease Construction
- ☐ Production
- ☐ Well Servicing
- ☐ Other

UNSAFE	SAFE	N/A	
			POSITIONS OF PEOPLE
☐	☐	☐	Awkward/Unstable Positions Avoided
☐	☐	☐	Body Placement in the Line-of-Fire Avoided
☐	☐	☐	Extended Reach Avoided
☐	☐	☐	Hand Hazards Avoided or Controlled
☐	☐	☐	Proper Techniques for Manual Lifting
☐	☐	☐	Safe Positions Maintained with respect to Loads
			PRACTICES & PROCEDURES
☐	☐	☐	Adequate Air Testing and Monitoring Conducted
☐	☐	☐	Energy Sources Isolated and Locked Out
☐	☐	☐	Following Processes and Procedures
☐	☐	☐	Ground Disturbance Checklist Used
☐	☐	☐	Hazard Assessment Conducted
☐	☐	☐	Housekeeping Maintained
☐	☐	☐	Safe Work Permit Used
			TOOLS & EQUIPMENT
☐	☐	☐	Appropriate for the Job
☐	☐	☐	Used Correctly
☐	☐	☐	Maintained in Safe Condition
☐	☐	☐	Stored Properly when not in use
☐	☐	☐	Fire Extinguishers Checked Monthly
☐	☐	☐	Eye Wash Stations Clean and Maintained
			PERSONAL PROTECTIVE EQUIPMENT
☐	☐	☐	Appropriate Eye/Face Protection
☐	☐	☐	Appropriate Head Protection
☐	☐	☐	Appropriate Clothing (FRC & insulating layer)
☐	☐	☐	Appropriate Reflective Clothing
☐	☐	☐	Appropriate Hand Protection
☐	☐	☐	Appropriate Hearing Protection

JOB OBSERVATION REPORT

Work Observed _____

What was observed? _____

What was said? Reinforcement/ Correction _____

What is required? Follow-up Action _____

Any change in behavior during observation ☐ Yes ☐ No?

If Yes, What? _____

Person Observed (optional)? _____

Observer Name (print) _____

Date (yyyy/mm/dd) _____

Completed forms to be e-mailed to EHS@harvestenergy.ca

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Ladder Inspection Checklist

Ladder Location			Date:	
Name of Person(s) Completing the Checklist:			Ladder ID Number:	
Items to be Inspected	**Pass or Fail or N/A**	**Action Required**	**By Who**	**By When**
Loose steps or rungs or other metal parts. **Action:** Remove from use: repair or discard				
Loose, damaged or corroded nails, screws, rivets or bolts **Action:** Remove from use: repair or discard				
Warped, bent or twisted uprights. **Action:** Discard: do not attempt repair				
Cracked, split or broken uprights, braces, steps or rungs. **Action:** Discard: do not attempt repair				
Slivers/ splinters on uprights, rungs or steps. **Action:** Remove from use: repair or discard				
Damaged, missing or worn non-slip feet. **Action:** Remove from use: repair or discard				
Ladder painted (may hide defeats). **Action:** Remove from use: remove paint or discard				
Extension Ladder				
Loosen, broken or missing extension locks. **Action:** Discard: do not attempt repair				
Defective rung locks that do not seat properly. **Action:** Remove from use: repair or discard				
Deterioration of rope (i.e., missing or frayed). **Action:** Remove from use: repair or discard				
Fixed Ladder on Tank				
Missing rungs or other structural components. **Action:** Red Tag and then repair.				
Damaged rungs, rails or ladder cage (if so equipped). **Action:** Refurbish, repair and if necessary tag red				
Signs of metal corrosion. **Action:** Refurbish, repair and if necessary tag red				
Loose fasteners or anchoring devices **Action:** Refurbish, repair and if necessary tag red				
Stepladder				
Wobbly or unstable. **Action:** Remove from use: repair or discard				
Loose or bent hinges and hinge spreaders. **Action:** Remove from use: repair or discard				
Broken stop on hinge spreaders. **Action:** Discard: do not use: repair or discard				
Damaged top, leg levelers or folding paint shelves. **Action:** Remove from use: repair or discard				
Ladder passes the inspection (write pass in next box)		**No Action Required**	**N/A**	**N/A**
Ladder fails inspection and repairs are required: **Red "Do Not Use" Tag Attached** ☐ **Yes** ☐ **No**		**See Above Notes**	Discarded ladders should be cut up or broken beyond repair, to prevent reuse.	
Repairs Completed and Ladder Approved for Use by: (print responsible persons name)	**Signature:**		**Date:** (file according to policy)	

May 16, 2012

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QUAD INSPECTION CHECKLIST

Unit #: _____ Mileage: _____ Last Service Date: _____

Date: _____ Driver: _____

Equipment Condition	OK	Action Required	Date Completed
Air Filter (last service, clean and oiled, dry)			
Ball Joints (loose, clean, caps in)			
Bear Spray/Bangers			
Brakes (spongy, squeal)			
Break Drums (drained, clean, dry)			
Clutch (last set, checked)			
CV Joints (clicking)			
Exhaust Packing			
First Aid Kit (with CPR Pocket Mask & Surgical Gloves)			
Flash Light (explosion-proof, working)			
Hand/Thumb Warmer (functioning)			
Hand Tools (clean, broken, damaged, accounted for)			
Helmet (clean, serviceable)			
Lights (head, tail, brake)			
Tires (pressure, % wear)			
Service (eng oil, diff oil)			
Starter (pull rope okay)			
Steering (normal, tight, loose)			
Tie Down Straps (tarp, ratchet straps)			
Valves (last serviced)			
Vent Hoses (clear, in place)			
Wheel Bearings (loose, greased)			
Winch (respooled, frayed)			
Windshield (cracked, solid, properly mounted)			

Inspected By: _ _____

Reviewed By (Next Level Supervision): _____

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Monthly AED Checklist

Year: _____ Month: _____
Unit Serial Number: _____ Location: _____

Items to be Inspected	Yes / No	Action Required	Date Completed
Is the unit clean, undamaged and free of any excessive wear?			
Are there any cracks or loose parts in the housing?			
Are the electrodes connected to the AED Plus & sealed in their package?			
Are all Cables free of Cracks, Cuts, exposed or broken wire?			
Is the GREEN check light **On** indicating it is ready for use?			
Are batteries past expiration date?			
Are electrodes past expiry date?			
Are all supplies (razor, mask, and rubber gloves) accounted for?			

Please refer to the Manufacturers operating Manual for any additional requirements/ information

Date: _____

Signature: _____

Breathing Apparatus Inspection

Facility _____ **Date** _____

Equipment Type	Unit Serial Number & Location	Condition of Hoses	Condition of Cylinder	Condition of Mask	Cylinder Full Y/N	Initials	Comments

Please refer to the Manufacturers operating Manual for any additional requirements/ information

Date _____

Signature _____

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Eye Wash Station Inspection Checklist

Year: _____ Month: _____
Location: _____

Items to be Inspected	Yes / No	Action Required	Date Completed
Is the unit clean, undamaged and free of any excessive wear?			
Are the outlet heads covered?			
Is the solution full?			
Is the solution past expiration date?			

Please refer to the Manufacturers operating Manual for any additional requirements/ information

Date: _____

Signature: _____

Monthly First Aid Kit Checklist

Year: _____ Month: _____ Location:_____

Description	Mandatory	Replacements
Bandages	1 box of 50	
Abdominal / Combine Pad - 20.3 x 25.4 cm	1	
Conforming Stretch Bandages - 7.6 x 3.7cm	2	
Gauze Pads	20	
Compress Bandage - 10.2 x 10.2 cm	3	
Compress Bandage - 15.2 x 15.2 cm	3	
Triangular Bandage - 101.6 x 101.6 x 142.2 cm	4	
Tape	1	
Elastic Support / Compression Bandage	2	
Antiseptic wipes	10	
Eye Dressing Pads	1	
Frist Aid & Emergency Care Guide	1	
Scissors	1	
Splinter Forceps - 8.1 cm	1	
Assorted Safety Pins	12	
Medical Examination Gloves	6	
Infectious Waste Bags - 15.2 x 22.9 cm	1	
CPR Face Shield with One-Way Filter Valve	1	

Is the case clean, undamaged and free of any excessive wear? Yes or No

Date: _____

Signature: _____

Portable Fire Extinguisher Inspection Checklist

Year	Month	Facility

Items to be Inspected:

Unit Serial Number & Location	Is the Fire Extinguisher in designated location?	Is all signage posted and free of damage?	Is the unit clean, undamaged and free of any excessive wear?	Is the safety seal and tamper indicators broken or missing?	Are there any cracks, corrosion, leakage or loose parts in the housing or hose?	Is the pressure gauge or indicator in the operable range or position (record reading)?	Action Required	Date Completed
	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No		

Please refer to the Manufacturers operating Manual for any additional requirements/ information

Date _____

Signature _____

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Tank Inspection Checklist (Monthly)

Location: _____ **Date of Inspection:** _____

The following visual examination around tanks and inside diked areas for signs of leaks and/or damage to tanks is required on a monthly basis to ensure tank integrity as per regulatory requirements.

	Tank S/N		**Tank S/N**		**Tank S/N**		**Tank S/N**		**Tank S/N**		**Tank S/N**	
Tank Contents (select one):	H_20 Yes	Oil No	H_20 Yes	Oil No	H_20 Yes	Oil No	H_20 Yes	Oil No	H_20 Yes	Oil No	H_20 Yes	Oil No
Bonding Cable – Present, Connected properly												
Cathodic Protection System - Operational												
Dikes – Maintained (adequate size), liner okay												
Double Wall Tanks – Interstitial Space okay (sight glass, valve, vacuum gauge, HLSD operation)												
Drainage - Adequate (away from tank)												
Fiberglass Tank - Gas blanket operational												
Fiberglass Tank - Metal parts bonded												
Gas Blanket System - Operational (if applicable)												
Grade Ring / Foundation - Structurally sound												
Housekeeping - Tank area clear of trash/garbage												
Housekeeping - Tank area clear of vegetation												
Insulation – Condition okay												
Leakage - Visible signs around tank bottom												
Leaks – Visible around tank connections												
Piping - Properly supported												
Roof Deck - Drainage Adequate (off of deck)												
Roof Deck - Holes												
Roof Deck - Severe corrosion and / or pits												
Staining – From past leakage												
Stairways/Walkways/Ladders - Structurally sound												
Structural Integrity - Distortions, warping												
Tank Extension Plate – clear of material or liquids												
Tank Nozzles – deflected, corroded												
Tank Properly Supported												
Tank Shell - Severe corrosion and/or pits												
Tank Foundation – washed out or settling												
Thief Hatch & Vent Valve Seals - air tight												
Warning / Hazard Signs - in place, adequate												

Inspected By:		**Signature**	
Reviewed By:		**Signature**	

Inspection records must be kept for a **minimum of 2 years** and any abnormal circumstances must be documented.

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TRANSPORTATION INSPECTION REPORT

NO: 000000

DATE:	AREA:	TRUCK PLATE:	HAULING FOR:
TIME:	TRUCKING FIRM:	TRAILER PLATE:	DRIVER:

LOCATION	ODOMETER	INSPECTOR'S NAME
(**Y**)= PASS	(N/A) = Not applicable	(**X**) = Needs Attention / FAIL

Safety	Walk around	Documentation

Shaded items are considered "Critical" – fail in any one of these items will result in an automatic "Out of Service" and denial of access to Harvest Operations Corp. (HOC) Facilities, until the deficiency has been corrected

Emergency road triangles		Inspect tires, tread & pressure		Valid driver's license	
First aid kit		Rims, lug nuts		Vehicle registration	
Fire extinguisher		Mud flaps		Vehicle insurance	
Expiry Month					
Spill kit		Leaks (air, fluids)		Valid CVIP inspections	
Intrinsically safe Flashlight		License plate		Valid tank inspections	
Personal 4 Head Monitor		Placards (TDG)		Bill of Lading	
Bump Tested today		Lights/reflectors		TDG card/documents	
Two way radio/cell phone		Load secured		WHMIS	
Hose Test certificate		Windshield/ wipers		H2S Alive	
Shovel		Vehicle body condition		First Aid	
Horn		Wheel chocks		Logbook	
Tire Chains		Positive air shut off (Auto / Manual).		Drivers vehicle inspection report	
PPE (Hardhat, FRC Coveralls, Boots, Eye protection and Gloves)		Pump bypass		Current HOC Term Agreement (signed by driver)	
Valid HOC Level 3 Field orientation (wallet card & hard hat sticker)		Carrier can produce Copies of Carriers' JSA's and Loading/Unloading Procedures		Hazard Assessment documentation and process has been followed	
Driver is aware of Work-Alone procedure		Driver can describe Elements of Work-Alone Procedure		Driver / Carrier has complied with Work-Alone Procedure / Policy	

Narrative

Driver's Signature:	Date:
Forward Copy To:	Inspectors signature:

1 – Facility Owner ***2 – Contractor*** ***3 -Inspector***

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TRANSPORTATION INSPECTION REPORT

DATE:	AREA:	
CARRIER:	Unit #:	DRIVER:
LOCATION:		INSPECTOR'S NAME:
(**Y**)= PASS	(N/A) = Not applicable	(**X**) = Needs Attention / FAIL

Deficiencies must be communicated to the Operations Foreman or Lead Operator.

On Board Equipment	Result	Comments
Fire extinguisher		
Spill kit		
Wheel chocks		
Hose Test certificate		
Positive air shut off (Auto / Manual).		
Personal Protective Equipment	**Result**	**Comments**
Personal 4 Head Monitor (today's Bump Test documentation)		
Breathing apparatus (load stations over 10 ppm H2S)		
Two way radio/cell phone (for emergency and working alone purposes)		
PPE (Hardhat, FRC Coveralls, Boots, Eye protection and Gloves)		
HOC Permitting	**Result**	**Comments**
Current HOC Term Agreement OR Safe Work Agreement (signed by driver)		
Valid HOC Level 3 Field orientation (wallet card & hard hat sticker)		
Safety Certifications: TDG card/documents, WHMIS, H2S Alive, First aid,		
Safe Work Procedures	**Result**	**Comments**
Carrier can produce Copies of Carriers' JSA's		
Pre-job Hazard Assessment documentation and outlined process is being followed		

Driver's Signature:	Date:
Forward Copy To Carrier, HOC Foreman and HOC EH&S (Contractor Engagement Coordinator: Lisa Stephenson)	Inspectors signature:

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TURNAROUND PRE-STARTUP INSPECTION CHECKLIST

Area: _____ **Location:** _____

Operations Rep: _____ **Date:** _____

Type of Facility (swb, sat, bty, comp, dehy, plant, etc) _____

A	SAFETY / EMERGENCY SYSTEMS	YES	NO	N/A
1.	**Climbing devices, hand/guard rails** Put back in place, adequate, i.e. fall protection, platforms, gates, etc.			
2.	**Electrical equipment:** reconnected correctly and ready for service, junction boxes closed			
3.	**Fire extinguishers:** fully charged, put back in place			
4.	**Lighting adequate:** All lights in working order			
5.	**Monitoring equipment:** available / checked (e.g. LEL, H_2S, Fire, etc)? Back in service No bags			
6.	**Safe operating limits:** clearly identified on gauges and controls? All set points set back to normal.			
7.	**Sources of static electricity:** i.e. steel pails returned and grounds hooked back up			
8.	**Tag out / lock out:** equipment in place & compliant? Check list gone through and all equipment set back to normal operation			
9.	**Walking and working areas:** free from slipping / tripping hazards? Garbage, old parts, piping, spills all cleaned up			
10.	**Forms:** e.g. Safe Work Agreement, Confined Space Entry Attachment, Near Miss/Hazard Identification, Waste Manifests, Equipment Logs, Production Records, etc on site? All turnaround documentation on site and filed. Store in binder.			
11.	**Breathing apparatus:** fully charged inspected and back in normal storage places			
B	**MECHANICAL SYSTEMS**			
1.	**All blinding/isolation/flagging:** have been confirmed as removed by walk through with the original list in hand			
2.	**Gauges:** properly located, ranged and legible? All Re-installed			
3.	**Flame arrestors:** serviced and scheduled for flash back testing once plant is back on line.			
4.	**Metering:** adequate (meets D-64 requirements)? All meters calibrated and ready for service and calibration tags updated			
5.	**Maintenance access:** All doors, man-ways, inspection panels in vessels, instrument and electrical covers all put back in place and tightened.			
6.	**Moving parts, hot equipment and pinch points:** adequately guarded, all guards reinstalled			
7.	**Piping:** adequate for service (temperature, sour service, hoses, etc)? Any bleed or purge hoses removed			
8.	**Potential gas vents:** (regulators, controllers, etc), vented outside. Ensure vent lines reinstalled			
9.	**All Shut down devices including ESD's:** function tests performed and documented Pressure, temperature, vibration, level protection adequate, properly ranged, functioning. Shut downs calibrated and ready for service, tags updated			

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		YES	NO	N/A
10.	**Purging:** procedure/plan available, responsibilities assigned			
11.	**Pressure testing (including pre-test) and leak check plan in place:** Equipment that had been opened up, identified for leak test after purging?			
12.	**Relief devices:** (PSV's, PCV's) adequate & correctly set? Properly calibrated, reinstalled in proper place. Updated tags installed			
13.	**Relief ports, blowouts and vents:** directed so that discharge does not present a hazard?. PSV relief piping back connected and in normal service			
14.	**Rotating parts:** Reconnected, correct rotation, guards reinstalled, locked out and tagged if leaving out of service			
15.	**Valves accessible:** or chains / platforms re-installed			
16.	**Valves correctly lined up:** (closed or open), as per P&ID.			
17.	**New anodes:** installed and reconnected			
18.	**Cathodic:** protection turned back on.			
C	**ENVIRONMENTAL CONTROL / COMPLIANCE (Is / Are)**			
1.	**Dykes / berms:** adequate as per regulations. Not beat down, liner integrity maintained, restore and re-contour if removed for TA			
2.	**Safeguards / equipment:** available & adequate in the event of a major spill or exposure			
3.	**Spill protection:** spill response equipment readily available			
D	**PROCEDURES / OPERATIONS MATERIAL (Is / Are)**			
1.	**Drawings updated:** record changes made, as builts, plot plans, photos on site and reviewed			
2.	**New Equipment:** added to OIP program if required			
3.	**New equipment:** added to PM program Pre-start up inspection completed			
4.	**Operating / maintenance procedures:** manuals on site. New equipment added			
5.	**Personnel:** properly oriented, trained on equipment operation and maintenance, including emergency procedures?			
6.				
E	**OTHER POTENTIAL HAZARDS / DEFICIENCIES IDENTIFIED (Is / Are)**			
1.	**NORM** contaminated products hauled away for proper disposal,			
2.	**NORM contaminated equipment/piping labeled as such for future reference**			
3.	**Schedule 7 day follow up checks (vibration, thread torques)**			
4.				

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SUBSTANDARD CONDITIONS SUMMARY AND FOLLOW-UP FOR PRE-STARTUP INSPECTIONS

LOCATION: _____ **DATE (Y-M-D)**

Rep's:

NO.	CONDITIONS/CORRECTIVE ACTION	ACTION BY: NAME	RISK RATING	TARGET DATE	COMPLETED DATE/INITIAL

FACILITY REVIEW	SIGNATURE	DATE (Y-M-D)
1st Review		
2nd Review		

Deficiencies shall be assigned a risk ranking of Unacceptable, Medium or Low using the risk assessment steps provided in Section 2, Hazard Identification, Risk Assessment and Controls of the Harvest EHS Program.

UNACCEPTABLE

Work must not proceed until hazard controls are implemented to reduce risk to a low level.

MEDIUM

Must implement hazard controls to reduce hazard to a low level.

LOW

Some hazard controls may still be justified.

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VEHICLE INSPECTION CHECKLIST

Inspection Frequency: **Harvest Operations Vehicles**: Monthly - **Contractor Vehicles:** Quarterly

Unit #: _____ Mileage: _____ Last Service Date: _____

Date: _____ Driver: _____

Vehicle Equipment Condition (All Vehicles)	**OK**	**Action Required**	**Date Completed**
Horn (working)			
Brakes (spongy, squeal)			
Insurance & Registration (current)			
Lights (head, tail, signal, brake, park, four way flashers, clean)			
Mirrors (properly adjusted, cracked)			
Radio/Phone (working)			
Tires, including spare (min 1)			
Windshield (chipped, cracked)			
Windshield Wipers (working, worn out, fluid)			
Jack (manufacturers or acceptable axle jack)			
Wheel Wrench (in place, available)			
License Plate (legible, clean, current)			
General Body Condition			
Items in Box secured			
Vehicle Interior Condition (general cleanliness, items in cab safely secured)			

Operator / Contract Operator Mandatory Equipment	**OK**	**N/A**	**Action Required**	**Date Completed**
Reflective Vests (reflective coveralls min)				
Fire Extinguisher (min 1 – 20 to 30# ABC in bracket)				
First Aid Kit (with CPR Pocket Mask & Gloves)				
Reflective Road Triangles (3)				
TDG Exemption Permits (current)				

Other / Optional Equipment	**OK**	**N/A**	**Action Required**	**Date Completed**
Booster Cables (heavy duty, damaged, ends okay)				
Flashlight (explosion-proof, working)				
Shovel				
Emergency Response Info (ph #'s, maps)				
Respiratory Protection (SABA, SCBA) (if required)				
Tow Strap (approved tow strap, with clevis available)				

Inspected By: _____

Reviewed By (Next Level Supervision): _____

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Wellsite or Small Facility Inspection Checklist

PROJECT NAME: _____

Area: _____ Location: _____

Operations Rep: _____ Date: _____

Facilities Rep: _____ Sweet or Sour _____

EHS Advisor: _____ Photos (Y/N) _____

Type of Facility (swb, sat, bty, comp, dehy, plant, etc) _____

A	SAFETY / EMERGENCY SYSTEMS (Is / Are)	YES	NO	N/A
1.	climbing devices adequate, i.e. fall protection, platforms, gates, etc?			
2.	electrical equipment requirements met re classification?			
3.	fire extinguishers, of the proper type available & sufficient (records)?			
4.	first aid, eyewash stations, etc available & sufficient?			
5.	handrails and guardrails proper & installed where needed?			
6.	hazard warning signs such as hearing protection, chemicals, eye protection, auto start, high temperatures, overhead/underground lines, WHMIS labeling/marking, etc, in place & adequate?			
7.	lighting adequate (100 or 12 volt, emergency power available)?			
8.	monitoring equipment available / checked (e.g. LEL, H_2S, Fire, etc)?			
9.	safe operating limits clearly marked on gauges and controls?			
10.	sources of static electricity addressed through grounding or bonding?			
11.	special PPE requirements available (rubber suits, goggles, face shields, etc)?			
12.	switches properly labeled (e.g. – Hand / Off / Auto)?			
13.	tag out / lock out equipment in place & compliant?			
14.	vapors, fumes, mists, noise, chemicals, etc. identified & addressed?			
15.	walking and working areas free from slipping / tripping hazards?			
B	**MECHANICAL SYSTEMS (Is / Are)**			
1.	blinding/isolation adequate, possible for repairs & turnarounds?			
2.	critical parts identified, available?			
3.	equipment or process safe if air, electricity, steam or vacuum fails (fail safe)?			
4.	gauges properly located, ranged and legible?			
5.	heaters accessible, safety shut off's operable, wired properly?			
6.	lifting devices proper, available, labeled, certified (e.g. for handling barrels)?			
7.	metering adequate (meets D-64 requirements)?			
8.	maintenance access been provided, adequate?			
9.	moving parts, hot equipment and pinch points adequately guarded?			
10.	noise abatement addressed for workers and landowners?			
11.	piping adequate for service (temperature, sour service, hoses, etc)?			
12.	potential gas vents (regulators, controllers, etc), vented outside?			
13.	pressure (internal) released when system is ESD'd?			

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		YES	NO	N/A
14.	pressure, temperature, vibration, level protection adequate, properly ranged, functioning?			
15.	pressure testing (including pre-test) and leak check of systems complete?			
16.	purging procedure/plan available, who's responsible?			
17.	relief devices (PSV's, PCV's) adequate & correctly set?			
18.	relief ports, blowouts and vents, directed so that discharge does not present a hazard?			
19.	remote shut downs (ESD Stn's) installed as required?			
20.	rotating parts checked for balance / alignment?			
21.	shutdown key functional, available?			
22.	special tools available, if required?			
23.	valves accessible or chains / platforms installed?			
24.	valves properly lined up (closed or open), as per P&ID?			
C	**ENVIRONMENTAL CONTROL / COMPLIANCE (Is / Are)**			
1.	dykes / berms adequate as per regulations?			
2.	D-64, D-60, D-55 requirements met?			
3.	regulations regarding storage, handling and disposal (D-55, D-58, etc) complied with?			
4.	safeguards / equipment available & adequate in the event of a major spill or exposure?			
D	**PROCEDURES / OPERATIONS MATERIAL (Is / Are)**			
1.	drawings, current, as builts, plot plans, on site and reviewed?			
2.	equipment added to OIP program?			
3.	equipment added to PM program?			
4.	facility license on site?			
5.	forms such as Safe Work Agreement, Confined Space Entry Attachment, Near Miss/Hazard Identification, Waste Manifests, Equipment Logs, Production Records, etc on site?			
6.	lines added to pipeline operations & maintenance manual?			
7.	operating / maintenance procedures manuals on site?			
8.	personnel properly oriented, trained on equipment operation and maintenance, including emergency procedures?			
E	**OTHER POTENTIAL HAZARDS / DEFICIENCIES IDENTIFIED (Is / Are)**			
1.	fences adequate to keep livestock in/out and personnel protected?			

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SUBSTANDARD CONDITIONS SUMMARY AND FOLLOW-UP FOR PRE-STARTUP INSPECTIONS

LOCATION: _____ **DATE (Y-M-D)**

Rep's:

NO.	CONDITIONS/CORRECTIVE ACTION	ACTION BY: NAME	RISK RATING	TARGET DATE	COMPLETED DATE/INITIAL

PROJECT REVIEW	SIGNATURE	DATE (Y-M-D)
1st Review		
2nd Review		

Deficiencies shall be assigned a risk ranking of Unacceptable, Medium or Low using the risk assessment steps provided in Section 2, Hazard Identification, Risk Assessment and Controls of the Harvest EHS Program.

UNACCEPTABLE

Work must not proceed until hazard controls are implemented to reduce risk to a low level.

MEDIUM

Must implement hazard controls to reduce hazard to a low level.

LOW

Some hazard controls may still be justified.

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Winter Preparation Checklist

Location: _____ **Date:** _____

This checklist is intended to be used as a guide to prepare your operations for winter.

Items to Check and Prepare	Action Required	Action Completed	Comments
Building/Facility Preparation			
All Insulation in place			
No Holes in the Walls			
Doors/Windows Closed			
Louvers Adjusted/Closed			
Roof Vents Adjusted/Closed			
Heat Trace On (Electric/Glycol)			
Heaters Turned On/Lit			
Building Overhead Protection in Place (Roof Rakes, Door Hoods, Eaves troughs…)			
Stairs/Walkways in Good Shape			
Utilidores Intact, (Access Doors Closed Panels in Place)			
Equipment Preparation			
Burners Serviced			
Coolant Levels/Concentrations			
Regular Service Completed			
Weather-fronts in place			
Louvers Functioning			
Portable fired heaters serviced and prepared as per manufacturers specs			
Snow removal attachments ready for service			
Portable steam trailer ready for service			
Snow machines ready for service			
Methanol			
• Tanks Full			
• Tanks grounded			
• Pumps Ready			
• Batch/Drip Pots in Place/Full			
• Baker Pumps Ready			
Instrument Air			
• Water Bled Out			
• Desiccant Fresh			
Vehicles Winterized			
• Winter Service Check done			
• Washer Fluid Full/Winter Type			
• Tires Good			
• Windshield Good			
• Emergency Equipment on Hand			
• Extra Clothing			
Other Considerations			
Snow Fences in Place (Where Required)			
Equipment Guards/Markers in Place			
Snow Shovels on Hand			
Sand/Salt/Ice Melt on Hand			

Inspected By: _____ Reviewed By: _____

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WORK AGREEMENT SYSTEM EVALUATION RECORD

Harvest Operations Corp. Facility: _____

Safe Work Agreement Type:

☐ Turnover ☐ Hot ☐ Cold

☐ Hazard Assessment ☐ Term

Safe Work Agreement #: _____ Work Order Number: _____

Description of work _____

Supplemental Documentation:

☐ Hazard Assessment and Pre-Job/Task Meeting ☐ Confined Space Entry Attachment

☐ Working in Proximity to Overhead Power Lines Form ☐ Ground Disturbance Permit

☐ Lockout/Tagout Record Sheet

☐ Other: _____

FOR ALL AGREEMENTS:

		Y	N
1.	Is the correct type of agreement used? (as per the Work Agreement Flowchart)	☐	☐
2.	Is supplementary documentation completed as required?	☐	☐
3.	Is the work location accurately described?	☐	☐
4.	Is the scope of work accurately described?	☐	☐
5.	Are site conditions properly evaluated?	☐	☐
6.	Are the worksite supervisor requirements complied with?	☐	☐
7.	Were all hazards identified?	☐	☐
8.	Are the appropriate controls identified and complied with?	☐	☐
9.	Are the hot work requirements complied with?	☐	☐
10.	Is atmospheric testing appropriate and complete?	☐	☐
11.	Is form properly signed?	☐	☐
12.	Are hazard assessment and pre-job safety meetings conducted and documented	☐	☐
13.	Are all workers aware of the Safe Work Agreement conditions? (interview workers)	☐	☐
14.	Is personnel protective equipment appropriate for job?	☐	☐

ADD FOR CONFINED SPACE ENTRY:

15.	Has the Pre-Entry Meeting / Checklist been properly completed?	☐	☐
16.	Was a Pre-entry Meeting conducted prior to work start? (interview workers)	☐	☐
17.	Has the emergency contact been properly identified?	☐	☐
18.	Is Confined Space Entry Attachment properly posted?	☐	☐
19.	Is Safety Watch aware of all personnel in confined space?	☐	☐
20.	Are workers aware of the rescue Plan, including the communication system?	☐	☐
21	Have all personnel in the confined space signed in?	☐	☐
22.	Other?	☐	☐

List outstanding concerns or follow-up that must be addressed: _____

_____

_____

Evaluator: _____ Date: _____

Reviewed By: _____ Date: _____

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Job Safety Analysis (JSA) Procedure

1. Determine the Occupation eg. Operator, mechanic, electrician

2. Determine the jobs within the occupation eg driving, pigging, compressor repairs

3. Conduct Job Safety Analysis (JSA)

a. Write a draft procedure by breaking the job into steps
b. Complete header section on the JSA Page 1.
c. Other considerations may consists of other applicable COP,JSA, Safety Alerts
d. Enter task steps (action) from draft procedure and identify hazards for each step (use a new line for each hazard)
e. Complete the initial risk ranking using the Harvest Risk Matrix.
f. Identify hazard controls that need to be in place for each hazard. If there are no controls write "none" or N/A
g. With the controls in place complete a final risk ranking using the Harvest Risk Matrix to ensure a Low ranking
h. Competent Personnel to check and observe job to verify procedure (JSA)
i. Area supervisor and EH&S Advisor to review and approve
j. Complete "reviewed by" portion in the header and date
k. Train staff and perform job observation competency checks
l. Document JSA Training on the JSA Competency Record Tab
m. Revise if job scope or conditions change
n. Save completed JSA in the following folder S:\Environment, Health and Safety\JSAs\JSA - NEW

4. Competency Verification: Practical (Job observation)

a. Validator observes the worker completing each step of the procedure
b. Validator and worker sign-off at the completion of the competency record
c. Save completed verification in the following folder S:\Environment, Health and Safety\JSAs\Competency Tracking

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Date Entered	Foreman's Initial	Task #	Task List	Freq	Prob	Sev	Risk Rating	Priority Rank	JSA Completed (Y/N)	Is procedure in place (Y/N)
		001		0	0	0	0	low		
		002					0	low		
		003					0	low		
		004					0	low		
		005					0	low		
		006					0	low		
		007					0	low		
		008					0	low		
		009					0	low		
		010					0	low		
		011					0	low		
		012					0	low		
		013					0	low		
		014					0	low		
		015					0	low		
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		041					0	low		
		042					0	low		
		043					0	low		
		044					0	low		
		045					0	low		
		046					0	low		
		047					0	low		
		048					0	low		
		049					0	low		
		050					0	low		

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Develop Critical Task List

a. Using the rating criteria on the Rate Criteria tab, rate the frequency that the job is conducted.
b. Using the rating criteria on the Rate Criteria tab, rate the probability that an event could occur while conducting that job.
c. Using the rating criteria on the Rate Criteria tab, rate the potential severity of the event.
d. The risk rating will calculate automatically.
e. Using the filter (arrow) button in the Risk Rating Column, select "Sort Descending".
f. Those jobs that are ranked high (16 and above) constitute a Critical Job and must have a JSA.

Frequency (How often a task is conducted, or workers are exposed to a hazard)		
Rating	**Definition**	
Negligible	Infrequent - Once per year or less	
Low (2)	Occasional - Quarterly / monthly, 1 - 3 times per year	
Medium (3)	Frequent - Weekly, 2 - 3 times per week	
High (4)	Daily - one or more times per day, 4 - 5 times per week	

Probability (Likelihood the event could occur) Move to following severity rating		
Rating	**Definition**	
Negligible (1)	Possible but not expected	
	One occurrence in industry in 20 years.	
Low (2)	Possibility of rare incident	
	One occurrence in life of facility.	
Medium (3)	Possibility of isolated incidents	
	One occurrence in subject facility in 3 years.	
High (4)	Possibility of repeated incidents	
	One or more occurrences per year.	

Severity (How severe the result of an event could be) How severe have these events been		
Rating	**Category**	**DEFINITION**
Negligible (1)	**Injury**	No foreseeable injury
	Environmental	On lease. Non-reportable to
	Property loss $	No foreseeable property loss
	Production loss	Downtime less than 1 day
	Public impact	No Impact
Low (2)	**Injury**	First Aid Injury
	Environmental	On lease. Reportable to Regulators
	Property Loss $	Damage or loss up to $10K
	Production loss	Downtime I day to I week
	Public impact	Complaint from public; Precautionary
Medium (3)	**Injury**	Medical treatment or restricted duty.
	Environmental	Off lease or with adverse affect.
	Property Loss $	Damage or loss $10 K to $500K
	Production loss	Downtime 1 week to 1 month
	Public impact	Warnings issued to public, shelter in
High (4)	**Injury**	Lost Time Injury, Fatality, permanent
	Environmental	Major impact to streams, groundwater,
	Property Loss $	Damage or loss $500K or more
	Production loss	Downtime 1 month or more
	Public impact	Injury or serious threat to public:

JSA Hazard Ratings
Low - No foreseeable injury or property/ environmental damage
Medium - Could cause an injury requiring first aid, minimal property / environmental damage (less than $10,0
High - Could cause injury requiring medical aid / modified work, moderate property/ environmental damage (between $1
Unacceptable - Could cause a Lost Time injury / Fatality, major property loss / environmental damage (greate

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Job Safety Analysis (JSA) Worksheet

Task:						
Date of development:	**Task #**					
Functional Group:	**Location:**	**Page 1 of**			**JSA Risk Rating:**	
Revision Date:					**Low**	**Medium**	**High**
Analysis By:				**Date:**		
Reviewed By:	**Title:**			**Date:**		
Approved By:	**Title:**			**Date:**		

Tools Equipment Material Required:			**Additional PPE Required**		**Other Considersations**

Sequence of Steps (List basic steps of the task)	**Potential Hazards** (Potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High

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Task Work Procedure

Task:					
Date of development:	Task #				
Functional Group:	Location:	Page 1 of		JSA Risk Rating:		
Revision Date:			Low	Medium	High

Tools, Equipment, Materials Required:			Aditional PPE Required		Other Considerations

Task Steps/Actions	Required Hazard Control(s)	Date	Supervisor(s) Name & Initial	Worker(s) Name & Initial

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Task Work Procedure

Task: Taking Cathodic Rectifier Readings				**Procedure #:**	
Date of issue:		**HAA No:**		**Page 1 of**	
Department: Operations		**Location:All**		**Sour Site? Yes/No**	**Yes**
Revision Date:	**Revision #:**				

Tools, Equipment, Materials Required:			**Aditional PPE Required**		**Other considerations**	
Keys for locks possibly			Gloves			
Wrench or screwdriver			Standard PPE			

Procedure:

Task Steps/Actions	Controls/Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)
1. Review weather conditions and do not take readings if it is raining or snowing	
2 .The recommended voltage and amperage targets from the Corrosion Survey Company should be written on the door of the rectifier and on the monthly cathodic sheet.	
3.Open up door on rectifier, remember there is power on the rectifier so Do not touch any electrical connections inside. Be sure to have the Toggle switch clearly marked.	
4. Record the tap settings on your monthly cathodic sheet	
5. Move the toggle switch to volts and take the volts reading on the scale on the display, then move the toggle switch to amps and take the amps reading on the scale on the display, record these readings in the 'as left' column on the monthly cathodic sheet.	
6. Close and lock the door (where required) and fax the monthly reading sheet to your Corrosion Survey Company .	
7. File your monthly cathodic sheet in the PM filing system, Filing # 3.3.3.	

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Job Safety Analysis (JSA) Worksheet

Task: Taking Cathodic Rectifier Readings	**HAA No:**	**Revision Date:**		**New:**	**x**
Department: Operations	**Location:All**	**Sour Site? Yes/No**	**Yes**	**Revised:**	

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Analysis By: Cory Gagnon, Dave Valentine, Travis Smith, Victor Gette, Brian McLeod, Ryan Heintz		**Date: November 25 / 2014**	
Reviewed By: Dave Valentine, Ryan Heintz, Travis Smith, other foremen and superintendents	**Title:**	**Date:**	
Approved By: Travis Smith, Mike Lukacs, Brad Hestad	**Title: Production Supts**	**Date: May 11/2015**	
Does the team have the necessary expertise to complete the assessment?	**Yes**	**If not, who else needs to be consulted:**	

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Keys for locks possibly			Gloves				
Wrench or screwdriver			Standard PPE				

Sequence of Steps (List basic steps of the task)	**Potential Hazards** (List potential hazards if there are no controls in place)	**Risk Rank each hazard** L**o**w,**M**ed. **U**nacceptable	**Current Hazard Control(s)** (List hazard controls already in place)	**Is Control Adequate (Y or N)**	**Description of Additional/Required Control** (If existing controls are not on place or are not adequate to control the hazard, list the recommended control)
Check to see if circuit breaker has tripped; if breaker is tripped it may be an indication of an electrical fault. Contact an electrician to determine the problem.	Electrocution from shorted out unit.	**Low**	Contact electrician immediately.	**Y**	Ensure the rectifier box is closed and locked (if accessible by the public) and contact lead operator
1. Review weather conditions and do not take readings if it is raining or snowing	Electric shock and getting electrical connections wet and shorting out.	**High**	Do not open rectifier box if raining or snowing.	**Y**	
2 .The recommended voltage and amperage targets from the Corrosion Survey Company should be written on the door of the rectifier and on the monthly cathodic sheet.		**Low**			
3.Open up door on rectifier, remember there is power on the rectifier so **Do not touch any electrical connections inside**. Be sure to have the Toggle switch clearly marked.	Electrical connections exposed, Electrocuted by Energy source.	**Low**	Pay attention to where the electrical connection areas are and do a "visual inspection only" which may include looking for any what seems to be loose connections or melted connections. **This is a visual inspection only, do not touch wires or connections.**	**Y**	If toggle switch is not marked notify lead operator to ensure that this step is carried out.
4. Record the tap settings on your monthly cathodic sheet	Visual only	**Low**	Visual inspection of tap settings only, **DO NOT TOUCH SETTINGS TAPS / BARS**	**Y**	
5. Move the toggle switch to volts and take the volts reading on the scale on the display, then move the toggle switch to amps and take the amps reading on the scale on the display, record these readings in the 'as left' column on the monthly cathodic sheet.	Electrocuted by Energy source, Cuts or pinch points.	**High**	Ensure gloves are clean and dry. Only touch toggle switch.	**Y**	Note: A dry anode/ground bed will result in lower readings. Water may need to be added to the bed to adjust these readings. Notify the lead operator. Electrician will have to make any adjustments if needed.
6. Close and lock the door (where required) and fax the monthly reading sheet to your Corrosion Survey Company .	Cuts and pinch points from cabinet door or latch	**Low**	Wear gloves		
7. File your monthly cathodic sheet in the PM filing system, Filing # 3.3.3.	None	**Low**			

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Task Work Procedure

Task: Taking Cathodic Rectifier Readings		**Procedure #:**	
Date of Issue:	**HAA No.**	**Sour Site? Yes/No**	**Yes**
Department: Operations	**Location:**	**Page 1 of**	
Revision Date:	**Revision #:**		

Tools, Equipment, Materials Required:			Aditional PPE Required		Other considerations				
Keys for locks possibly									
Wrench or screwdriver									
0									

Procedure:

Task Steps/Actions	Controls/Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operators Name	Date	Supervisor Initial	Worker Initial
1. Review weather conditions and do not take readings if it is raining or snowing	Electric shock and getting electrical connections wet and shorting out.				
2 .The recommended voltage and amperage targets from the Corrosion Survey Company should be written on the door of the rectifier and on the monthly cathodic sheet.					
3.Open up door on rectifier, remember there is power on the rectifier so Do not touch any electrical connections inside. Be sure to have the Toggle switch clearly marked.	Electrical connections exposed, Electrocuted by Energy source.				
4. Record the tap settings on your monthly cathodic sheet	Visual only				
5. Move the toggle switch to volts and take the volts reading on the scale on the display, then move the toggle switch to amps and take the amps reading on the scale on the display, record these readings in the 'as left' column on the monthly cathodic sheet.	Electrocuted by Energy source, Cuts or pinch points.				
6. Close and lock the door (where required) and fax the monthly reading sheet to your Corrosion Survey Company .	Cuts and pinch points from cabinet door or latch				
7. File your monthly cathodic sheet in the PM filing system, Filing # 3.3.3.	None				

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Job Safety Analysis (JSA) Worksheet

Task: Charcoal Filter Change			**Procedure #: 3.6.1**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.1**		**Sour Site? ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	**Task Risk Rating Outcome:**
Replacement Filters	Absorbant Pads		SCBA/ SABA		Review MSDS prior to task	
Empty Pails	Gauges		Rubber Gloves		Fluid Temp	
Approved disposal storage bin						
Hand tools required						

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Bypass gas detection on PLC if applicable	ESD plant, Bypassing safety devices	**High**	Refer to site specific MOC**	**Low**	
2. Open bypass valve. Close inlet and outlet valves on filter	Pressure build-up	**High**	Lock out isolation valves, gauges in place, personal monitor, PSV	**Low**	
3. Open drain valve and bleed pressure and fluid to appropriate system	H2S if draining to open system, LEL, Fluid on open system, Spills	**High**	Don SCBA/ SABA if open system, ensure back-up has adequate air supply, personal monitors, monitor gauges, ensure adequate storage capacity for spent fluid	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
4. Open fuel gas valve on top of filter to get all liquids out and to purge H2S	Pessure build-up, fluid spill on open system, LEL	**High**	Open valces slowly, Personal monitors, monitor gauges, secure hose end if draining to open system	**Low**	
5. Close fuel gas valve after system is purged	Possible valve failure	**Low**	Close valve slowly	**Low**	
6. Remove cap from filter container	H2S on rich system, LEL, Fuild spray, Spills, trapped pressure, slips, trips, falls, pinch points, strains	**High**	SCBA/ SABA	**Low**	
7. Remove spent charcoal filters and dispose of appropriately	H2S on rich system, LEL, Fuild spray, Spills, trapped pressure, slips, trips, falls, pinch points, strains	**High**	SCBA/ SABA, personal monitors, body positioning, PPE, correct lifting technique	**Low**	
	Exposure to Benzene liquids	**High**	Use proper PPE: gloves and proper respiratory equipment	**Low**	
8. Install new charcoal filters	Strains, slips, trips, falls, pinch points, fuild spray	**Med**	SCBA/ SABA, personal monitors, body positioning, PPE, correct lifting technique	**Low**	
9. Put cap back on container and tighten	Strains, slips, trips, falls, pinch points	**Med**	SCBA/ SABA, personal monitors, body positioning, PPE, correct lifting technique	**Low**	
10. Close drain valve	Possible valve failure	**Low**	Close valve slowly	**Low**	
11. Slowly open inlet valve and choke byass to purge air out of system. When cannister is full, close bleed valve and open outlet valve	H2S on rich system, LEL, Fuild spray, over pressure	**Med**	Open valces slowly, Personal monitors, monitor gauges, secure hose end if draining to open system	**Low**	
12. Check for leaks. If no leaks and area is free from H2S, remove SCBA/ SABA	Muscle strain	**Low**	Correct doffing procedure	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
13. Monitor pressures	none	**Low**	none	**Low**	
14. Turn off gas detection bypass on PLC	Forgetting to do it!!!	**High**	Bypass timers, MOC procedure	**Low**	

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Task Work Procedure

Task: Charcoal Filter Change			**Procedure #: 3.6.1**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.1**		**Sour Site? ALL**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**
Replacement Filters	Absorbant Pads		SCBA/ SABA		Review MSDS prior to task
Empty Pails	Gauges		Rubber Gloves		Fluid Temp
Approved disposal storage bin					
Hand tools required					

Procedure:

Task Steps/ Action	**Controls/ Considerations** (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	**Operations Name**	**Date**	**Supervisor Initial**	**Worker Initial**
1. Bypass gas detection on PLC if applicable	Refer to site specific MOC**				
2. Open bypass valve. Close inlet and outlet valves on filter	Lock out isolation valves, gauges in place, personal monitor, PSV				
3. Open drain valve and bleed pressure and fluid to appropriate system	Don SCBA/ SABA if open system, ensure back-up has adequate air supply, personal monitors, monitor gauges, ensure adequate storage capacity for spent fluid				
4. Open fuel gas valve on top of filter to get all liquids out and to purge H2S	Open valces slowly, Personal monitors, monitor gauges, secure hose end if draining to open system				
5. Close fuel gas valve after system is purged	Close valve slowly				
6. Remove cap from filter container	SCBA/ SABA				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
7. Remove spent charcoal filters and dispose of appropriately	SCBA/ SABA, personal monitors, body positioning, PPE, correct lifting technique				
	Use proper PPE: gloves and proper respiratory equipment				
8. Install new charcoal filters	SCBA/ SABA, personal monitors, body positioning, PPE, correct lifting technique				
9. Put cap back on container and tighten	SCBA/ SABA, personal monitors, body positioning, PPE, correct lifting technique				
10. Close drain valve	Close valve slowly				
11. Slowly open inlet valve and choke byass to purge air out of system. When cannister is full, close bleed valve and open outlet valve	Open valces slowly, Personal monitors, monitor gauges, secure hose end if draining to open system				
12. Check for leaks. If no leaks and area is free from H2S, remove SCBA/ SABA	Correct doffing procedure				
13. Monitor pressures	none				
14. Turn off gas detection bypass on PLC	Bypass timers, MOC procedure				

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Job Safety Analysis (JSA) Worksheet

Task: Driving			**Procedure #: 3.6.2**			
Date of issue: Nov. 2, 2015	**HAA No: 3.6.2**		**Sour Site? ALL**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team						
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**			

Tools, Equipment, Materials Required:		Additional PPE Required		Other considerations	Task Risk Rating Outcome:
Operational Vehicle				Risk Assess - Is the journey necessary?	
Vehicle Inspetion Form				Posted speed limits to be followed	
Equipment as per vehicle inspection form				Complete vehicle walk around	
				Traffic Laws	

Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on control then what?
1. Vehicle Inspection	Slips and Trips (mud, ice)	**Low**	Be aware of surroundings and conditions	**Low**	Proper footwear
	Other traffic (passing vehicles)	**Low**	Be aware of surroundings and conditions	**Low**	Listening and looking for oncoming traffic, proper fatigue management
2. 360 degree walk around vehicle	Slips and trips	**Low**	Be aware of surroundings and conditions	**Low**	Proper footwear

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on control then what?
	Other Traffic (passing vehicles)	**Low**	Be aware of surroundings and conditions	**Low**	Listening and looking for oncoming traffic, proper fatigue management
3. Enter Vehicle	Slipping while getting into vehicle	**Med**	Proper running boards as applicable	**Low**	
4. Drive Vehicle	Collision with other vehicle(s)	**High**	Wear seat belts, Follow posted speed limits, drive to the conditions	**Low**	Do not use electronic devices - e.g. cellphone, laptops, GPS
	Loose cargo inside cab	**High**	Secure cargo inside cab or remove items	**Low**	Inside cab organizer, or strap items with seat belt
	Ejection from vehicle	**High**	Wear seat belts	**Low**	Do not use electronic devices - e.g. cellphone, laptops, GPS
	Unsecured cargo in truck beds	**High**	Properly secure cargo and ensure it meets applicable TDG requirements	**Low**	Ensure TDG Manifests are present and current
	Collision with animal(s), stationary objects	**High**	Wear selt belts, Follow posted speed limits, drive to the conditions, 360 Walk around	**Low**	Do not use electronic devices - e.g. cellphone, laptops, GPS, knowledge of area and animal travel routes
	Poor Driving conditions - e.g. slippery, fog, ice	**Med**	Follow posted speed limits, drive to the conditions	**Low**	This training can included skid control
	Stranded - e.g. Breakdown, struck	**Med**	Working Communication, ensure vehicle is in good condition, Working Alone, winter clothes, emergency kit	**Low**	
	Fatigue	**Med**	Properly rested, take regular breaks, practice journey management	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on control then what?**
	Blowout	**Med**	Ensure tire pressures and condition are good	**Low**	
	Excessive Speed	**High**	Follow posted speed limits, drive to the conditions	**Low**	
5. Arrive at Destination (parking)	Conjested parking area	**Low**	Watch for other vehicles, personnel, stationary objects	**Low**	
	Backing into objects	**Low**	Pulling through or backing into parking stall. Be aware of surroundings and conditions	**Low**	
	Vehicle movement	**Low**	Ensure tansmission is in park and parking brake is set	**Low**	
	Wellhead	**High**	Barricades	**Low**	
6. Exit Vehicle	Slips and Trips (mud, ice)	**Low**	Be aware of surroundings and conditions	**Low**	

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Task Work Procedure

Task: Driving			**Procedure #: 3.6.2**			
Date of issue: Nov. 2, 2015	**HAA No: 3.6.2**		**Sour Site? ALL**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**
Operational Vehicle					Risk Assess - Is the journey necessary?
Vehicle Inspetion Form					Posted speed limits to be followed
Equipment as per vehicle inspection form					Complete vehicle walk around
					Traffic Laws

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Date	Supervisor Name & Initial	Worker(s) Name & Initial
1. Vehicle Inspection	Be aware of surroundings and conditions, wear appropriate footwear			
2. 360 degree walk around vehicle	Be aware of surroundings and conditions, wear appropriate footwear			
3. Enter Vehicle	Proper running boards as applicable			
	Be aware of surroundings and conditions			
4. Drive Vehicle	Be aware of surroundings and conditions, drive to conditions			
	Wear seat belts,			

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Date	Supervisor Name & Initial	Worker(s) Name & Initial
	Properly rested, take regular breaks, practice journey management			
	Properly secure cargo and ensure it meets applications TDG requirements			
	Working communications, ensure vehicle is in good condition, Working Alone, winter clothes, emergency kit			
	Ensure tire pressures and condition are good			
	Follow posted speed limits, drive to the conditions			
4. Arrive at Destination (parking)	Watch for other vehicles, personnel, stationary objects			
	Pulling through or backing into parking stall. Be aware of surroundings and conditions			
	Ensure transmission is in park and parking brake is set			
	Barricades			
5. Exit Vehicle	Be aware of surroundings and conditions			

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Job Safety Analysis (JSA) Worksheet

Task: Hydrate Removal - Long Pipeline			Procedure #: 3.6.5		
Date of issue: Sept 11, 2009	HAA No: 3.6.5		Sour Site? ALL		
Department: Operations	Location: ALL		Page 1 of 1		
Revised By:	Revision Date:		JSA Risk Rating:	Low	Medium	High

JSA Variation Team		
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:

Does the team have the necessary expertise to complete the assessment?	Yes	No	If not, who else needs to be consulted:

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations	
						Task Risk Rating Outcome:

Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Isolate section of line with suspection hydrate	Sprains and or strains while closing valves	**Med**	Isolate smallest section of line as possible close to suspected hydrate. Valve Maintenace	**Low**	For all steps in this JSA the H.O.C Code of Practice for Hydrate Removal must be adhered too. All Personnel involved in hydrate removal must be trained in the COP
2. Determine first downstream point of impact	Equipment failure	**High**	Check for control valves, closed valves, elbows, tees & reducers. Keep all workers clear of there areas	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Install pressure indicators (gauges) on each end of the isolated line	Minimal	**Low**	Always assume multiple hydrate plugs in line	**Low**	
4. De-pressure, **"SLOWLY"**, one end of the isolated section of line by not more than **10%**	Unexpected movement of hydrate could cause equipment failure	**High**	Do **NOT** exceed **10%** of normal operating pressure increments when depressuring line. If pressure indicators read the same and decrease at the same rate, the hydrate plugs is not in this section	**Low**	
5. Continue to move along pipeline, isolating as short of section as possible until you locate hydrate	Sprains and or strains while closing valves	**Med**	Watch for multiple hydrate plugs, isolate smallest section of line as possible close to suspected hydrate. Valve Maintenance	**Low**	
6. Inject or pump methanol into line, while "slowly" depressuring other end of line	Exposure to Methanol	**High**	Reduce pressure below hydrate formation point, but, **"NOT"** to zero. See Engineer for Hydrate Formation Point. Ensure proper PPE is used.	**Low**	
7. Close bleed valves and allow hydrate time to dissipate	Unexpected movement of hydrate could cause equipment failure	**Med**	This will prevent rapid movement of the partially disintegrated hydrate plug and prevent damage	**Low**	
8. Checking for hydrate dissipation. Monitor pressure indicators to determine if hydrate plug is moving.	Unexpected movement of hydrate could cause equipment failure	**Med**	Change in either pressure indicator, indicators the hydrate plug is moving. Continue to control the movement of the hydrate plug by controlling the rate of depressurization	**Low**	
9. Close bleed off (depressuring) valve nearest to downstream side or plug	Sprains and or strains while closing valves	**Med**	Ensure pressure gauge are on hydrate side of valves	**Low**	
10. **"Slowly"** pressure up the line	Unexpected movement of hydrate could cause equipment failure	**High**	Both pressure indicators at either end of the hydrate should rise at the same rate. If they **"DO NOT"**, the hydrate plug has only partially dissipated	**Low**	
11. If hydrate plug **"HAS NOT"** dissipated, go back to Step 1	Hazard as above	**High**	Always assume multiple hydrate plugs in line	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
12. If hydrate has dissipated, **"slowly"** put the line back into service	Reformation of a hydrate if line is put back into service to quickly	**Med**	Slowly establish "low" flow rates to prevest remaining hydrates from attaining enough energy to cause a problem. Either add methonal or get temperature high enough to prevent futher hydrates from forming	**Low**	

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Task Work Procedure

Task: Hydrate Removal - Long Pipeline			Procedure #: 3.6.5			
Date of issue: Sept 11, 2009	HAA No: 3.6.5		Sour Site? ALL			
Department: Operations	Location: ALL		Page 1 of 1			
Revised By:	Revision Date:		JSA Risk Rating:	Low	Medium	High

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Isolate section of line with suspection hydrate	Isolate smallest section of line as possible close to suspected hydrate. Valve Maintenace				
2. Determine first downstream point of impact	Check for control valves, closed valves, elbows, tees & reducers. Keep all workers clear of there areas				
3. Install pressure indicators (gauges) on each end of the isolated line	Always assume multiple hydrate plugs in line				
4. De-pressure, "SLOWLY", one end of the isolated section of line by not more than 10%	Do NOT exceed 10% of normal operating pressure increments when depressuring line. If pressure indicators read the same and decrease at the same rate, the hydrate plugs is not in this section				
5. Continue to move along pipeline, isolating as short of section as possible until you locate hydrate	Watch for multiple hydrate plugs, isolate smallest section of line as possible close to suspected hydrate. Valve Maintenance				
6. Inject or pump methanol into line, while "slowly" depressuring other end of line	Reduce pressure below hydrate formation point, but, "NOT" to zero. See Engineer for Hydrate Formation Point. Ensure proper PPE is used.				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
7. Close bleed valves and allow hydrate time to dissipate	This will prevent rapid movement of the partially disintegrated hydrate plug and prevent damage				
8. Checking for hydrate dissipation. Monitor pressure indicators to determine if hydrate plug is moving.	Change in either pressure indicator, indicators the hydrate plug is moving. Continue to control the movement of the hydrate plug by controlling the rate of depressurization				
9. Close bleed off (depressuring) valve nearest to downstream side or plug	Ensure pressure gauge are on hydrate side of valves				
10. "Slowly" pressure up the line	Both pressure indicators at either end of the hydrate should rise at the same rate. If they "DO NOT", the hydrate plug has only partially dissipated				
11. If hydrate plug "HAS NOT" dissipated, go back to Step 1	Always assume multiple hydrate plugs in line				
12. If hydrate has dissipated, "slowly" put the line back into service	Slowly establish "low" flow rates to prevest remaining hydrates from attaining enough energy to cause a problem. Either add methonal or get temperature high enough to prevent futher hydrates from forming				

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Job Safety Analysis (JSA) Worksheet

Task: Hydrate Removal - Short Pipeline			Procedure #: 3.6.6		
Date of issue: Sept 11, 2009	HAA No: 3.6.6		Sour Site? ALL		
Department: Operations	Location: ALL		Page 1 of 1		
Revised By:	Revision Date:		JSA Risk Rating:	Low	Medium	High
JSA Variation Team					
Name:	Title:		Date:		
Name:	Title:		Date:		
Name:	Title:		Date:		
Name:	Title:		Date:		
Name:	Title:		Date:		
Name:	Title:		Date:		
Does the team have the necessary expertise to complete the assessment?	Yes	No	If not, who else needs to be consulted:		

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations	Task Risk Rating Outcome:

Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Isolate section of line with suspection hydrate	Sprains and sprains from operating stiff or seized valves	Med	Isolate smallest section of line as possible close to suspected hydrate. Properly maintain valves	Low	
2. Determine first downstream point of impact	Equipment failure	High	Check for control valves, closed valves, elbows, elbows, tees & reducers. Keep all workers clear of there areas	Low	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Install pressure indicators (gauges) on each end of the isolated line	Minimal	**High**	Always assume multiple hydrate plugs in line	**Low**	
4. De-pressure, **"SLOWLY"**, both sides of plugs	Unexpected movement of hydrate could cause equipment failure	**High**	Do **NOT** exceed 70kPa differential, and reduce pressure in increments of maximum 10% or normal operating pressure. This will prevent movement of the partially disintegrated hydrate plug. If pressures are flutuating, close valves, this will stop or slow down movement or hydrate plug.	**Low**	
5. Reduce pressure below hydrate formation point, "BUT", not to zero	Unexpected movement of hydrate could cause equipment failure	**Med**	See Engineer for hydrate Formation Point	**Low**	
6. (A) Check for hydrate Dissipation	Unexpected movement of hydrate could cause equipment failure	**High**	Don't rush! The hydraulic effect of the hydrate plug moving against a closed valve will cushion the force of the hydrate plug	**Low**	
6. (B) Close bleed off (Depressuring) valve nearest to downstream side of plug	Minimal	**Low**	Ensure pressure gauge are on hydrate side of valves	**Low**	
7. "Slowly", pressure up the line	Unexpected movement of hydrate could cause equipment failure	**Med**	Both pressure indicators at either end of the hydrate should rise at the same rate. If they "DO NOT", the hydrate plug has only partially dissipated	**Low**	
8. If hydrate plug HAS NOT dissipated, go back to Step 1	Hazard as above	**High**	Always assume multiple hydrate plugs in line	**Low**	
9. If hydrate has dissipated, "slowly" put line back into service	Hydrate re-formation from to rapidly re-pressuring the line	**Low**	Slowly establish "low" flow rates to prevest remaining hydrates from attaining enough energy to cause a problem. Either add methonal or get temperature high enough to prevent futher hydrates from forming	**Low**	

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Task Work Procedure

Task: Hydrate Removal - Short Pipeline			Procedure #: 3.6.6		
Date of issue: Sept 11, 2009	HAA No: 3.6.6		Sour Site? ALL		
Department: Operations	Location: ALL		Page 1 of 1		
Revised By:	Revision Date:		JSA Risk Rating:	Low	Medium	High

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Isolate section of line with suspection hydrate	Isolate smallest section of line as possible close to suspected hydrate. Properly maintain valves				
2. Determine first downstream point of impact	Check for control valves, closed valves, elbows, elbows, tees & reducers. Keep all workers clear of there areas				
3. Install pressure indicators (gauges) on each end of the isolated line	Always assume multiple hydrate plugs in line				
4. De-pressure, "SLOWLY", both sides of plugs	Do NOT exceed 70kPa differential, and reduce pressure in increments of maximum 10% or normal operating pressure. This will prevent movement of the partially disintegrated hydrate plug. If pressures are flutuating, close valves, this will stop or slow down movement or hydrate plug.				
5. Reduce pressure below hydrate formation point, "BUT", not to zero	See Engineer for hydrate Formation Point				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. (A) Check for hydrate Dissipation	Don't rush! The hydraulic effect of the hydrate plug moving against a closed valve will cushion the force of the hydrate plug				
6. (B) Close bleed off (Depressuring) valve nearest to downstream side of plug	Ensure pressure gauge are on hydrate side of valves				
7. "Slowly", pressure up the line	Both pressure indicators at either end of the hydrate should rise at the same rate. If they "DO NOT", the hydrate plug has only partially dissipated				
8. If hydrate plug HAS NOT dissipated, go back to Step 1	Always assume multiple hydrate plugs in line				
9. If hydrate has dissipated, "slowly" put line back into service	Slowly establish "low" flow rates to prevest remaining hydrates from attaining enough energy to cause a problem. Either add methonal or get temperature high enough to prevent futher hydrates from forming				

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Job Safety Analysis (JSA) Worksheet

Task: Installing Orifice Plate - Daniels Senior			**Procedure #: 3.6.7**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.7**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		
Grease Sticks	Daniel's Wrench				Adjustable Wrench		**Task Risk Rating Outcome:**
Orifice Plates	Spare gasket or material				Slips, trips and falls		
Clean Rags					Venting		
Pail					Building entry procedure		

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Check for leaks	Exposure to toxic substances	**Low**	Monitors	**Low**	
2. Ensure bleedoff is open	Gas release	**Low**	Monitors	**Low**	This is providing the vent is closed & parking does not fail

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Put O.P. into carrier.,	Exposure to toxic substances	**Low**	Monitors	**Low**	Document plate size on chart. Ensure bevel of orifice plate is down and not scars on plate
4. Install carrier into charger	Exposure to toxic substances	**Low**	Monitors	**Low**	
	Pressure release, bad door gasket	**Med**	Check door is secure	**Low**	
5. Roll into carrier until seated, flush with body front	Hand injury	**Low**	Gloves	**Low**	Wrench slips
6. Install gasket and door, tightend bolts to specified torque	Hand injury	**Low**	Gloves	**Low**	1, 3, 2, 4 left to right
7. Close bleed	Hand injury	**Low**	Gloves	**Low**	Wrench slips
8. Equalize	N/A	**Low**	Gloves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
9. Check for leaks	Hand injury	**Low**	Gloves	**Low**	Wrench slips
10. Open gate	Exposure to toxic substances	**Med**	Monitors	**Low**	
11. Roll plate into flow	Exposure to pressure	**Med**	Stand away from vent pipe	**Low**	Ensure pressure bled off, prior to moving to next step
12. Close gate		**Med**	Open bleed slowly	**Low**	
13. Close equalizer valve	Exposure to toxic substances	**High**	Monitors	**Low**	
14. Bleed pressure from outer chamber	Exposure to pressure	**Low**	Stand aside from gate	**Low**	Be aware, bleed can plug off

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
15. Close bleed valve	Exposure to toxic substances	**High**		**Low**	This is to check to see if there is pressure inside changer

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Task Work Procedure

Task: Installing Orifice Plate - Daniels Senior			**Procedure #: 3.6.7**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.7**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Grease Sticks	Daniel's Wrench				Adjustment wrench	
Orifice Plates	Spare gasket or material				Slips, trips and falls	
Clean Rags					Venting	
Pail					Building entry procedure	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Check for leaks	Monitors				
2. Ensure bleedoff is open	Monitors				
3. Put O.P. into carrier.,	Monitors				
4. Install carrier into charger	Monitors				
	Check door is secure				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Roll into carrier until seated, flush with body front	Gloves				
6. Install gasket and door, tightend bolts to specified torque	Gloves				
7. Close bleed	Gloves				
8. Equalize	Gloves				
9. Check for leaks	Gloves				
10. Open gate	Monitors				
11. Roll plate into flow	Stand away from vent pipe				
12. Close gate	Open bleed slowly				
13. Close equalizer valve	Monitors				
14. Bleed pressure from outer chamber	Stand aside from gate				
15. Close bleed valve					

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Job Safety Analysis (JSA) Worksheet

Task: Installing Orifice Plate - Daniels Senior Sour			**Procedure #: 3.6.8**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.8**		**Sour Site: YES**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Grease Sticks	Daniel's Wrench				Adjustable Wrench		
Orifice Plates	Spare gasket or material				Slips, trips and falls		
Clean Rags					Venting		
Pail					Building entry procedure		

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Check for leaks	Exposure to toxic substances	**Low**	Monitors	**Low**	
2. Ensure bleedoff is open	Gas release	**Low**	Monitors	**Low**	This is providing the vent is closed & parking does not fail

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Put O.P. into carrier.,	Exposure to toxic substances	**Low**	Monitors	**Low**	Document plate size on chart. Ensure bevel of orifice plate is down and not scars on plate
4. Install carrier into charger	Exposure to toxic substances	**Low**	Monitors	**Low**	
	Pressure release, bad door gasket	**Med**	Check door is secure	**Low**	
5. Roll into carrier until seated, flush with body front	Hand injury	**Low**	Gloves	**Low**	Wrench slips
6. Install gasket and door, tightend bolts to specified torque	Hand injury	**Low**	Gloves	**Low**	1, 3, 2, 4 left to right
7. Close bleed	Hand injury	**Low**	Gloves	**Low**	Wrench slips
8. Equalize	N/A	**Low**	Gloves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
9. Check for leaks	Hand injury	**Low**	Gloves	**Low**	Wrench slips
10. Open gate	Exposure to toxic substances	**Med**	Monitors	**Low**	
11. Roll plate into flow	Exposure to pressure	**Med**	Stand away from vent pipe	**Low**	Ensure pressure bled off, prior to moving to next step
12. Close gate		**Med**	Open bleed slowly	**Low**	
13. Close equalizer valve	Exposure to toxic substances	**High**	Monitors	**Low**	
14. Bleed pressure from outer chamber	Exposure to pressure	**Low**	Stand aside from gate	**Low**	Be aware, bleed can plug off

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
15. Close bleed valve	Exposure to toxic substances	**High**		**Low**	This is to check to see if there is pressure inside changer

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Task Work Procedure

Task: Installing Orifice Plate - Daniels Senior Sour			**Procedure #: 3.6.8**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.8**		**Sour Site: YES**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Grease Sticks	Daniel's Wrench				Adjustment wrench	
Orifice Plates	Spare gasket or material				Slips, trips and falls	
Clean Rags					Venting	
Pail					Building entry procedure	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Check for leaks	Monitors				
2. Ensure bleedoff is open	Monitors				
3. Put O.P. into carrier.,	Monitors				
4. Install carrier into charger	Monitors				
	Check door is secure				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Roll into carrier until seated, flush with body front	Gloves				
6. Install gasket and door, tightend bolts to specified torque	Gloves				
7. Close bleed	Gloves				
8. Equalize	Gloves				
9. Check for leaks	Gloves				
10. Open gate	Monitors				
11. Roll plate into flow	Stand away from vent pipe				
12. Close gate	Open bleed slowly				
13. Close equalizer valve	Monitors				
14. Bleed pressure from outer chamber	Stand aside from gate				
15. Close bleed valve					

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Job Safety Analysis (JSA) Worksheet

Task: Lighting Burners			**Procedure #: 3.6.9**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.9**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**		

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Tornado Propane Torch			Face Shield		Body Positioning-Stand to side		
					Note Wind Direction		

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Close all fuel sources to burner	None	**Low**	None	**Low**	
2. Reset low temp shut down if equipped, or open pilot fuel bypass valve	None	**Low**	None	**Low**	
3. Open access port and allow firetube to air out	Possible trapped gas	**Med**	Air out properly	**Low**	Allow a minimun of 5-10 minutes to air out

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
4. Once burner box is aired out, stand to side and insert ignitor and light the ignitor	Flash Back	**High**	Ensure burner box is aired out. Stand to the side	**Low**	Ensure 0% LEL prior to lighting torch
5. Slowly open pilot gas valve	Flash Back	**High**	Stand aside	**Low**	Ensure to stand to side. Ensure torch tip is just in front of pilot tip and lite the torch
6. Once pilot is lit, extinguish and remove ignitor. Close pilot bypass vlave. If pilot does not ignite return to step #1. If pilot lites continue to Step #7	None	**Low**	None	**Low**	Keep Thermostat valve shut. Listen for pilot ignition. If pilot doesn't ignite immediately, shut pilot gas valve and check position of pilot, make sure it's lite and retry pilot
7. Close access port	Pinch points	**Low**	Positioning	**Low**	
8. Ensure all bolts, plugs are secure and in place on all burner components	None	**Low**	None	**Low**	Ensure pilot stays lit once access door or 4" plug is closed
9. Slowly open main fuel gas valve and listen for full burner ignition	Flash Back	**Med**	Ensure body is to side of view port	**Low**	If main doesn't kick in right away check treater temp. If at operating temp. Check burner later in day
10. Check flame condition through site glass	None	**Low**	None	**Low**	If flame blows out, close valves and start over procedure at step 1
11. If burner requires adjustment follow burner adjustments procedure	None	**Low**	None	**Low**	
12. Ensure burner reaches operating temperature and does not exceed	None	**Low**	None	**Low**	

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Task Work Procedure

Task: Lighting Burners			**Procedure #: 3.6.9**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.9**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:	Additional PPE Required	Other considerations
Tornado Propane Torch	Face Shield	Body Positioning-Stand to side
		Note Wind Direction

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Close all fuel sources to burner	None				
2. Reset low temp shut down if equipped, or open pilot fuel bypass valve	None				
3. Open access port and allow firetube to air out	Air out properly				
4. Once burner box is aired out, stand to side and insert ignitor and light the ignitor	Ensure burner box is aired out. Stand to the side				
5. Slowly open pilot gas valve	Stand aside				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Once pilot is lit, extinguish and remove ignitor. Close pilot bypass vlave. If pilot does not ignite return to step #1. If pilot lites continue to Step #7	None				
7. Close access port	Positioning				
8. Ensure all bolts, plugs are secure and in place on all burner components	None				
9. Slowly open main fuel gas valve and listen for full burner ignition	Ensure body is to side of view port				
10. Check flame condition through site glass	None				
11. If burner requires adjustment follow burner adjustments procedure	None				
12. Ensure burner reaches operating temperature and does not exceed	None				

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Job Safety Analysis (JSA) Worksheet

Task: Lowering Raising Pumpjack Sucker Rods			**Procedure #: 3.6.10**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.10**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Clamps					Two person work		
Wrenches							
Platform							

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure pumpjack brake holds, if it does not do not proceed until its repaired	Equipment movement	**Unaccept.**	Repair brake	**Med**	
2. Once it is confirmed the brake holds, put weights in the up position, horseshead down	Weight movement	**High**	Secure weights	**Med**	
3. Position one person on the brake and motor area	Slips, trips	**Low**	Proper body positioning, proper foot wear	**Low**	
4. Position second person at the front of the pumpjack	Slips, trips	**Low**	Proper body positioning, proper foot wear	**Low**	
5. Ensure communication is available between both workers	Miscommunication	**Med**	Visual Contact	**Low**	
6. Rotate pumpjack until rod string is approximately 25 - 30 cm. Above bottom of downstroke	Strains	**Low**	Proper body positioning	**Low**	
7. Lock brake	Sprains, Strains	**Low**	Proper body positioning	**Low**	
	Pinches, cuts	**Med**	Proper PPE - Gloves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
8. Move bottom rod clamp to top of stuffing box and tighen. Maximum on 125 ft/lbs of toque is to be used unless otherwise specified by the manufacturer. Only 3 bolt clamps should used. 2 bolt clamps need to be replaced	Equipment movement	**High**	3 Bolt clamps	**Med**	
	Slips, falls	**Med**	Proper body positioning	**Low**	
9. Ensure clamp holds rod string weight	Equipment movement	**Med**	Recheck to ensure proper installation	**Low**	
10. Take weight off the bridle	Bridle does not take weight	**Med**	Recheck to ensure proper installation	**Low**	
11. Loosen top clamp above bridle and raise clamp up 15cm. (6") and tighten to 125 ft/lbs of torque	Slips, falls	**Med**	Proper body positioning	**Low**	
12. Slowly release the brake and allow weight to rotate until bridle hold rod weight is off bottom clamp	Rod clamps slip	**Med**	Recheck to ensure proper installation	**Low**	
13. Set brake	Strains, sprains	**Low**	Proper body positioning	**Low**	
14. Loosen bottom clamp and raise up until clamp is above travelling distance of the rod string	Slips, falls	**High**	Proper body positioning	**Low**	
15. Release brake and start motor	Strains, sprains	**Low**	Proper body positioning	**Low**	
16. Check for tap	Pinches, cuts	**Med**	Proper PPE - Gloves	**Low**	
17. Repeat above steps as necessary to raise or lower to obtain optimum position of the rod string	All hazards listed above apply	**As above**	All controls listed above apply	**Low**	

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Task Work Procedure

Task: Lowering Raising Pumpjack Sucker Rods			**Procedure #: 3.6.10**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.10**		**Sour Site: ALL**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Clamps					Two person work	
Wrenches						
Platform						

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure pumpjack brake holds, if it does not do not proceed until its repaired	Repair brake				
2. Once it is confirmed the brake holds, put weights in the up position, horseshead down	Secure weights				
3. Position one person on the brake and motor area	Proper body positioning, proper foot wear				
4. Position second person at the front of the pumpjack	Proper body positioning, proper foot wear				
5. Ensure communication is available between both workers	Visual Contact				
6. Rotate pumpjack until rod string is approximately 25 - 30 cm. Above bottom of downstroke	Proper body positioning				
7. Lock brake	Proper body positioning				
8. Move bottom rod clamp to top of stuffing box and tighen. Maximum on 125 ft/lbs of toque is to be used unless otherwise specified by the manufacturer. Only 3 bolt clamps should used. 2 bolt clamps need to be replaced	Proper PPE - Gloves				
	3 Bolt clamps				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
	Proper body positioning				
9. Ensure clamp holds rod string weight	Recheck to ensure proper installation				
10. Take weight off the bridle	Recheck to ensure proper installation				
11. Loosen top clamp above bridle and raise clamp up 15cm. (6") and tighten to 125 ft/lbs of torque	Proper body positioning				
12. Slowly release the brake and allow weight to rotate until bridle hold rod weight is off bottom clamp	Recheck to ensure proper installation				
13. Set brake	Proper body positioning				
14. Loosen bottom clamp and raise up until clamp is above travelling distance of the rod string	Proper body positioning				
15. Release brake and start motor	Proper body positioning				
16. Check for tap	Proper PPE - Gloves				
17. Repeat above steps as necessary to raise or lower to obtain optimum position of the rod string	All controls listed above apply				

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Job Safety Analysis (JSA) Worksheet

Task: Pigging Sour - Receiving			**Procedure #: 3.6.11**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.11**		**Sour Site: YES**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?			**Yes**	**No**	**If not, who else needs to be consulted:**		
Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Metal Drain Container	Wire brush	Thread gauge	Rubber Gloves		Do no stand in front of trap	Slips, trips and falls	
Pigs	Spare "O" rings	Ground Cable	SABA/SCBA		Dispose of wastes properly	MSDS	
Cap Wrench	Grease				Ensure no pressure build up	Follow inspection recommendations	
Crescent wrench	Clean rags				Safety Alert Pig Trap (07)		

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure drain valve and vent valves are closed	Leak at pig receiver cap or other fittings, Exposure to LEL., H2S	**High**	Ensure cap is tight, "O" ring is in good condition, tighen fittings, PM program. Personal monitor for possible exposure to LEL, H2S	**Low**	If a leak detected then breathing apparatus must be donned if work is to continue or repairs will be made. Refer to HOC H2S COP.
2. Don breathing apparatus	Ensure equipment is in good working order and serviced properly	**Low**	Complete preuse inspection.	**Low**	
3. Open inlet valve to allow reciever pressure to equalize	Vent valve leaks - Exposure to LEL, H2S	**High**	Valve maintenance - PM program. Personal monitor must be worn to warn of exposure to LEL, H2S	**Low**	
	Pressure will not equalize	**Low**	Ascertain reason and repair, monitor pressure	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
4. Open outlet valve, close bypass valve, check for leaks	Valve stiff, muscle strain	**Low**	Service valve, open with caution, correct body position	**Low**	Communicate with sender as applicate
5. Wait for pig to arrive, when possible and practicable	Pig stops in valve, trapped pressure	**Low**	Pressure up behind pig, not exceeding line pressure	**Low**	If necessary throttle pig in using outlet valve
6. Once it is confrimed pig has arrived open the bypass valve, and close inlet and outlet valves of the reciever	leaks (valves do not hold) - Exposure to LEL, H2S	**Low**	Service valve(s)	**Low**	
	Trapped pressure	**Med**	Monitor gauge, proper body position	**Low**	
7. Open vent and drain valves and drain the trap. Depressure barrel. Follow required legislation	Liquids/ Gas - receiver does not fully drain	**Med**	Ensure drain valves are clean to allow fluid to drain	**Low**	
	Pressure - valve plugged	**Med**	Monitor gauge, proper body position	**Low**	
8. Check barrel pressure, should be zero	H2S exposure	**High**	Don breathing apparatus	**Low**	
9. Remove the pig receiver cover (cap). Providing all pressures have been bled down	Being struck by receiver cap. Receiver is not fully depressured. Exposure to H2S, LEL	**High**	Monitor pressure in the trap by observing any releases that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer. Don breathing apparatus	**Low**	
	Pressure built up behind pig. Exposure to LEL, H2S	**Med**	Monitor pressure in the trap by observing any releases that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer. Don breathing apparatus	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
	Released pressure - liquid and or vapors. Exposure to LEL, H2S	**High**	Personal monitor, slowly remove cap and slowly release pressure. Don breathing apparatus	**Low**	
10. Remove the pig and clean the wax and other deposits from the pig trap	Fire, explosion, (LEL) exposure to toxic atmosphere (H2S)	**High**	Remove pig slowly and stand to the side of the receiver. Slide out pig cage to remove pig noting any wax that comes with it. Refer to MSDS, use proper PPE	**Low**	
11. Clean and lubricate threads. Use thread gauge	Cuts, abrasions	**Low**	Replace "O" ring as required. Personal monitor and breathing apparatus	**Low**	
12. Inspect pig cap condition including threads, "O" rings wear and tear	Fire, explosion, (LEL) exposure to toxic atmosphere (H2S)	**High**	Replace "O" ring as required.	**Low**	
13. Inspect the big barrel	Fire, explosion, (LEL) exposure to toxic atmosphere (H2S)	**high**	Personal monitor, breathing apparatus	**Low**	
14. Replace cover (cap)	Flying chips, fragments	**Low**	Use proper installation wrench, use correct position - stand to the side	**Low**	
	Pinch points	**Low**	Keep hands/ fingers clear of threads when closing cap	**Low**	
	Strains	**Low**	Correct body position	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
15. Close bleed off and drain valves	Valves leak, Exposure to LEL, H2S	**Low**	Maintain valves, personal monitor, breathing apparatus	**Low**	
16. Check for leaks	Leaks on fittings	**Low**	Depressure and tighten or service valves. Personal monitor, breathing apparatus	**Low**	
17. Keep pig for re-use, wash in solvent if necessary	Exposure to hazardous material. LEL, H2S	**High**	Wear appropriate PPE, check MSDS, visually inspect pig	**Low**	
18. Record date, time and ID# of recovery	None	**Low**	None	**Low**	

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Task Work Procedure

Task: Pigging Sour - Receiving			**Procedure #: 3.6.11**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.11**		**Sour Site: YES**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Metal Drain Container	Wire brush	Thread guage	Rubber Gloves		Do not stand in front of trap	Slips, trips and falls
Pigs	Spare "O" rings	Ground Cable	SABA/SCBA		Dispose of wastes properly	MSDS
Cap Wrench	Grease				Ensure no pressure build up	Follow inspection recommendations
Crescent wrench	Clean rags				Safety Alert Pig Trap (07)	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure drain valve and vent valves are closed	Ensure cap is tight, "O" ring is in good condition, tighen fittings, PM program. Personal monitor for possible exposure to LEL, H2S				
2. Open inlet valve to allow reciever pressure to equalize	Valve maintenance - PM program. Personal monitor must be worn to warn of exposure to LEL, H2S				
	Ascertain reason and repair, monitor pressure				
3. Open outlet valve, close bypass valve, check for leaks	Service valve, open with caution, correct body position				
4. Wait for pig to arrive, when possible and practicable	Pressure up behind pig, not exceeding line pressure				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Once it is confrimed pig has arrived open the bypass valve, and close inlet and outlet valves of the reciever	Service valve(s)				
	Monitor gauge, proper body position				
6. Open vent and drain valves and drain the trap. Depressure barrel. Follow required legislation	Ensure drain valves are clean to allow fluid to drain				
	Monitor gauge, proper body position				
7. Check barrel pressure, should be zero	Don breathing apparatus				
8. Remove the pig receiver cover (cap). Providing all pressures have been bled down	Monitor pressure in the trap by observing any releases that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer. Don breathing apparatus				
	Monitor pressure in the trap by observing any releases that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer. Don breathing apparatus				
	Personal monitor, slowly remove cap and slowly release pressure. Don breathing apparatus				
9. Remove the pig and clean the wax and other deposits from the pig trap	Remove pig slowly and stand to the side of the receiver. Slide out pig cage to remove pig noting any wax that comes with it. Refer to MSDS, use proper PPE				
10. Clean and lubricate threads. Use thread gauge	Replace "O" ring as required. Personal monitor and breathing apparatus				
11. Inspect pig cap condition including threads, "O" rings wear and tear	Replace "O" ring as required.				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
12. Inspect the big barrel	Personal monitor, breathing apparatus				
13. Replace cover (cap)	Use proper installation wrench, use correct position - stand to the side				
	Keep hands/ fingers clear of threads when closing cap				
	Correct body position				
14. Close bleed off and drain valves	Maintain valves, personal monitor, breathing apparatus				
15. Check for leaks	Depressure and tighten or service valves. Personal monitor, breathing apparatus				
16. Keep pig for re-use, wash in solvent if necessary	Wear appropriate PPE, check MSDS, visually inspect pig				
17. Record date, time and ID# of recovery	None				

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Job Safety Analysis (JSA) Worksheet

Task: Pigging Sour - Sending			**Procedure #: 3.6.12**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.12**		**Sour Site: YES**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**		

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Cap Wrench			SCBA/ SABA		Backup Personnel		
Pigs			Gloves				
Rags							

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure reciever is ready	Leaks-exposure to hazardous products	**Low**	Observe area for indicatons of leaks. Do not approach area if leak is apparent until assistance and hazard assessment have been completed	**Low**	
2. Ensure proper pig is available	Minimal	**Low**	Check condition and size	**Low**	
3. Proceed to the pig sender barrel	Slips, trips and falls	**Low**	Watch for uneven ground and slippery surfaces	**Low**	
4. Shut inlet and outlet valves of the pig barrel	Strains opening stiff valves	**Med**	Proper maintenance of valves	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
5. Inform back-up (as applicable) that you are going to launch the pig	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
6. Don breathing apparatus	Failed seal, no air	**High**	Ensure equipment is in good working order and serviced properly	**Low**	Ensure backup is aware that you are donning breathing apparatus. Refer to section 3.4.11 Respiratory Protection COP and section 3.4.8
7. Open vent and check for pressure	Exposure to hazardous products	**High**	Look and listen when it is a non-closed system. Use proper PPE	**Low**	
8. Ensure no-pressure is on the pig barrel	Exposure to hazardous products	**High**	If there is pressure determine the amount of pressure and determine if safe to proceed. If the pressure is excessive steop work and repair as necessary. If the pressure is not excessive then proceed with caution. Use proper PPE	**Low**	
9. Proceed to open the pig barrel using the proper cap wrench to complete this task	Exposure to hazardous products	**High**	Listen for any type of pressure release. Use proper PPE	**Low**	
10. Turn cap off slowly	Exposure to hazardous products, release of pressure resulting in being struck by the cap	**High**	Stand to the side of pig barrel. Use proper PPE	**Low**	
11. Once cap is removed insert pig	Exposure to hazardous products, release of pressure resulting in being struck by the cap	**Med**	Stand to the side of pig barrel. Use proper PPE	**Low**	
12. Ensure pig is seated	Exposure to hazardous products, release of pressure resulting in being struck by the pig	**Med**	Stand to the side of pig barrel. Use proper PPE	**Low**	
13. Inspect cap o-ring	Minimal	**Low**	Replace o-ring if necessary. If o-ring is in good condition; grease and install	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
14. Check threads on both the cap and pig barrel	Cuts and scrapes	**Low**	Use proper thread gage and proper PPE (gloves)	**Low**	
15. Install cap	Equipment failure	**Low**	**DO NOT OVER TIGHTEN**	**Low**	
16. Close vents, drains and install plugs	Minimal	**Low**	Use proper PPE	**Low**	
17. Open downstream valve on the pig barrel	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
18. Close bypass valve	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
19. Open upstream valve slowly	Proper maintenance of valves	**Med**		**Low**	
20. Confirm that pig has left sender	Minimal	**Low**	Stand to the side of pig barrel	**Low**	
21. Open bypass valve	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
22. Isolate the pig barrel	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
23. Bleed the pig barrel down through the drain	Exposure to hazardous products	**High**	Ensure no leaks on piping. Use proper PPE	**Low**	
24. Open the pig barrel	Exposure to hazardous products	**High**	Follow the opening procedure, never look directly into the barrel, use the proper tool to ensure the pig is no in the barrel. Use proper PPE	**Low**	
25. Replace cap	Minimal	**Low**	If pig has launched, job is complete	**Low**	
26. Open downstream valve on the pig barrel	All hazards listed above	**High**	If pig has not launched, reinstall cap and complete launch steps again. Once the procedure has been completed than recheck for pig launch	**Low**	

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Task Work Procedure

Task: Pigging Sour - Sending			**Procedure #: 3.6.12**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.12**		**Sour Site: YES**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Cap Wrench			SCBA/ SABA		Backup Personnel	
Pigs			Gloves			
Rags						

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure reciever is ready	Observe area for indicatons of leaks. Do not approach area if leak is apparent until assistance and hazard assessment have been completed				
2. Ensure proper pig is available	Check condition and size				
3. Proceed to the pig sender barrel	Watch for uneven ground and slippery surfaces				
4. Shut inlet and outlet valves of the pig barrel	Proper maintenance of valves				
5. Inform back-up (as applicable) that you are going to launch the pig	Proper maintenance of valves				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Don breathing apparatus	Ensure equipment is in good working order and serviced properly				
7. Open vent and check for pressure	Look and listen when it is a non-closed system. Use proper PPE				
8. Ensure no-pressure is on the pig barrel	If there is pressure determine the amount of pressure and determine if safe to proceed. If the pressure is excessive steop work and repair as necessary. If the pressure is not excessive then proceed with caution. Use proper PPE				
9. Proceed to open the pig barrel using the proper cap wrench to complete this task	Listen for any type of pressure release. Use proper PPE				
10. Turn cap off slowly	Stand to the side of pig barrel. Use proper PPE				
11. Once cap is removed insert pig	Stand to the side of pig barrel. Use proper PPE				
12. Ensure pig is seated	Stand to the side of pig barrel. Use proper PPE				
13. Inspect cap o-ring	Replace o-ring if necessary. If o-ring is in good condition; grease and install				
14. Check threads on both the cap and pig barrel	Use proper thread gage and proper PPE (gloves)				
15. Install cap	**DO NOT OVER TIGHTEN**				
16. Close vents, drains and install plugs	Use proper PPE				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
17. Open downstream valve on the pig barrel	Proper maintenance of valves				
18. Close bypass valve	Proper maintenance of valves				
19. Open upstream valve slowly	Proper maintenance of valves				
20. Confirm that pig has left sender	Stand to the side of pig barrel				
21. Open bypass valve	Proper maintenance of valves				
22. Isolate the pig barrel	Proper maintenance of valves				
23. Bleed the pig barrel down through the drain	Ensure no leaks on piping. Use proper PPE				
24. Open the pig barrel	Follow the opening procedure, never look directly into the barrel, use the proper tool to ensure the pig is no in the barrel. Use proper PPE				
25. Replace cap	If pig has launched, job is complete				
26. Open downstream valve on the pig barrel	If pig has not launched, reinstall cap and complete launch steps again. Once the procedure has been completed than recheck for pig launch				

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Job Safety Analysis (JSA) Worksheet

Task: Pigging Sweet - Receiving			**Procedure #: 3.6.13**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.13**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?			**Yes**	**No**	**If not, who else needs to be consulted:**		
Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Container	Wire Brush	Thread Gauge	Rubber Gloves		Do no stand in front of trap	Slips, trips and falls	
Pig	Spare "O" Rings				Dispose of wastes properly	MSDS	
Cap Wrench	Grease				Ensure no pressure build up		
Cresent Wrench	Clean Rags						

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Close drain valve and fill the reciever by opening trap bypass valve	Leak at pig trap cap or other fittings, LEL.	**Low**	Ensure cap is tight, "O" ring is in good condition, tighten fittings, PM program	**Low**	
2. Close vent valve to allow receiver pressure to equalize through trap bypass valve	Vent valve leaks	**Low**	Maintain valve	**Low**	
	Pressure will not equalize	**Low**	Determine the reason and repair, monitor pressure	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
3. Open mainline receiver valve	Valve stiff, muscle strain	**Low**	Service valve, open with caution, correct body position	**Low**	
4. When pig arrives, partially close mainline bypass valve to help force pig into receiver (if it stops before passing through the valve)	Pig stops in valve, trapped pressure	**Low**	Pressure up behind pig, not exceeding line pressure	**Low**	
5. Isolate the pig receiver	Leaks (valve do not hold)	**Low**	Service valve(s)	**Low**	
	Trapped pressure	**Med**	Monitor gauge, proper body position	**Low**	
6. Open vent and drain valves and drain the trap as necessary	Liquids - receiver does not fully drain	**Med**	Ensure drain valves are clean to allow fluid to drain	**Low**	
	Pressure - valve plugged	**Med**	Monitor gauge, proper body position	**Low**	
7. Remove the pig receiver cover (cap)	Being struck by receiver cap. Receiver is not fully depressured	**High**	Monitor pressure in the trap by observing any release that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer	**Low**	
	Pressure built up behind pig	**Med**	Monitor pressure in the trap by observing any release that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
	Released pressure - liquid and or vapors	**Med**	Personal monitor, slowly remove cap and slowly release pressure	**Low**	
8. Remove the pig and clean the wax and other deposits from the pig trap	Exposure to hazardous material	**Med**	Remove pig slowly and stand to the side of the receiver. Slide out pig cage to remove pig noting any wax that comes with it. Refer to MSDS, Use proper PPE	**Low**	
9. Clean and lubricate threads	Leaks ("O" ring is in poor condition)	**Low**	Replace "O" ring as required	**Low**	
10. Inspect pig cap condition including threads, "O" rings and wear and tear	None	**Low**	None	**Low**	
11. Inspect the pig barrel	LEL	**Low**	Personal monitor	**Low**	
12. Replace cover (cap)	Flying chips, fragments	**Low**	Use proper installation wrench, use correct position - stand to the side	**Low**	
	Pinch points	**Low**	Keep clear of threads when closing cap	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
	Strains	**Low**	Correct body position	**Low**	
13. Close bleed off and drain valves	Valves leak	**Low**	Maintain valves	**Low**	
14. Open mainline pig trap valve	Leaks on fittings	**Low**	Depressure and tighten on service valves	**Low**	
15. Keep pig for re-use, wash in solvent if necessary	Chemicals, wax	**Med**	Wear appropriate PPE, check MSDS, visually inspect pig	**Low**	
16. Record date, time and ID # of recovery	None	**Low**	None	**Low**	

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Task Work Procedure

Task: Pigging Sweet - Receiving			**Procedure #: 3.6.13**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.13**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Container	Wire Brush	Thread Gauge	Rubber Gloves		Do not stand in front of trap	Slips, trips and falls
Pig	Spare "O" Rings				Dispose of wastes properly	MSDS
Cap Wrench	Grease				Ensure no pressure build up	
Cresent Wrench	Clean Rags					

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Close drain valve and fill the reciever by opening trap bypass valve	Ensure cap is tight, "O" ring is in good condition, tighten fittings, PM program				
2. Close vent valve to allow receiver pressure to equalize through trap bypass valve	Maintain valve				
	Determine the reason and repair, monitor pressure				
3. Open mainline receiver valve	Service valve, open with caution, correct body position				
4. When pig arrives, partially close mainline bypass valve to help force pig into receiver (if it stops before passing through the valve)	Pressure up behind pig, not exceeding line pressure				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Isolate the pig receiver	Service valve(s)				
	Monitor gauge, proper body position				
6. Open vent and drain valves and drain the trap as necessary	Ensure drain valves are clean to allow fluid to drain				
	Monitor gauge, proper body position				
7. Remove the pig receiver cover (cap)	Monitor pressure in the trap by observing any release that may occur when removing cap. Stand to the side and use the cap wrench to remove. Do not use hammer				
	Personal monitor, slowly remove cap and slowly release pressure				
8. Remove the pig and clean the wax and other deposits from the pig trap	Remove pig slowly and stand to the side of the receiver. Slide out pig cage to remove pig noting any wax that comes with it. Refer to MSDS, Use proper PPE				
9. Clean and lubricate threads	Replace "O" ring as required				
10. Inspect pig cap condition including threads, "O" rings and wear and tear	None				
11. Inspect the pig barrel	Personal monitor				
	Use proper installation wrench, use correct position - stand to the side				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
12. Replace cover (cap)	Keep clear of threads when closing cap				
	Correct body position				
13. Close bleed off and drain valves	Maintain valves				
14. Open mainline pig trap valve	Depressure and tighten on service valves				
15. Keep pig for re-use, wash in solvent if necessary	Wear appropriate PPE, check MSDS, visually inspect pig				
16. Record date, time and ID # of recovery	None				

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Job Safety Analysis (JSA) Worksheet

Task: Pigging Sweet - Sending			**Procedure #: 3.6.14**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.14**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**		

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		
Container	Wire Brush	Thread Gauge	Rubber Gloves		Do no stand in front of trap	Slips, trips and falls	**Task Risk Rating Outcome:**
Pig	Spare "O" Rings				Dispose of wastes properly	MSDS	
Cap Wrench	Grease				Ensure no pressure build up		
Cresent Wrench	Clean Rags						

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure receiver is ready	Leaks-exposure to natural gas or oil mists	**Low**	Observe area for indications of leaks. Do not approach area if leak is apparent until assistance and hazard assessment have been completed	**Low**	
2. Ensure proper pig is available	Minimal	**Low**	Check condition and size	**Low**	
3. Proceed to the pig sender barrel	Slips, trips and falls	**Low**	Watch for uneven ground and slippery surfaces	**Low**	
4. Check to see that the bypass valve is open	Strains opening stiff valves	**Med**	Proper maintenance of valves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
5. Shut inlet and outlet valves of the pig barrel	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
6. Bleed the pig barrel down through the drain	Minimal	**Low**	Watch for unusual releases of produced product	**Low**	
7. Inform downstream operations that you are going to launch the pig	Exposure to natural gas or oil mists	**Med**	Look and listen when it is non-closed system. Use proper PPE	**Low**	
8. Open vent and check for pressure	Exposure to natural gas or oil mists	**Med**	If there is pressure determine the amount of pressure and determine if safe to proceed. If the pressure is excessive stop work and repair as necessary. If the pressure is not excessive then proceed with caution. Use proper PPE	**Low**	
9. Ensure no-pressure is on the big barrel	Exposure to natural gas or oil mists	**Med**	Listen for any types of pressure release. Use proper PPE	**Low**	
10. Proceed to open the pig barrel using the proper cap wrench to complete this tisk	Exposure to natural gas or oil mists, release of pressure resulting in being struck by the cap	**High**	Stand to the side of pig barrel. Use proper PPE	**Low**	
11. Remove cap slowly	Exposure to natural gas or oil mists, release of pressure resulting in being struck by the cap	**Med**	Stand to the side of pig barrel. Use proper PPE	**Low**	
12. Once cap is removed insert pig	Exposure to natural gas or oil mists, release of pressure resulting in being struck by the cap	**Med**	Stand to the side of pig barrel. Use proper PPE	**Low**	
13. Ensure pig is seated	Minimal	**Low**	Replace "O" ring if necessary. If "O"ring is in good condition; grease and install	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
14. Inspect cap "O" ring	Cuts and scrapes	**Low**	Use proper thread gauge and proper PPE (gloves)	**Low**	
15. Check threads on both the cap and pig barrel	Equipment failure	**Low**	**DO NOT OVER TIGHTEN**	**Low**	
16. Install cap	Minimal	**Low**	Use proper PPE	**Low**	
17. Close vents and drains and install plugs	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
18. Open downstream valve on the pig barrel	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
19. Open upstream valve slowly	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
20. Close bypass valve	Minimal	**Low**	Stand to the side of pig barrel	**Low**	
21. Confirm that pig has left sender	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
22. Open bypass valve	Strains opening stiff valves. Ensure no leaks on piping	**Med**	Proper maintenance of valves	**Low**	
23. Isolate the pig barrel	Exposure to natural gas or oil mists	**Med**	Ensure no leaks on piping. Use proper PPE	**Low**	
24. Bleed the pig barrel down through the drain	Exposure to natural gas or oil mists	**Med**	Follow the opening procedure, never look directly into the barrel, use the proper tool to ensure the pig is not in the barrel. Use proper PPE	**Low**	
25. Open the pig barrel	Minimal	**Low**	If pig has launched, job is complete	**Low**	
26. Replace cap	All the hazards listed above	**Med**	If pig has not launched, reinstall cap and complete launch steps again. Once the procedure has been completed than recheck for pig launch.	**Low**	

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Task Work Procedure

Task: Pigging Sweet - Sending			**Procedure #: 3.6.14**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.14**		**Sour Site: NO**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Container	Wire Brush	Thread Gauge	Rubber Gloves		Do not stand in front of trap	Slips, trips and falls
Pig	Spare "O" Rings				Dispose of wastes properly	MSDS
Cap Wrench	Grease				Ensure no pressure build up	
Cresent Wrench	Clean Rags					

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure receiver is ready	Observe area for indications of leaks. Do not approach area if leak is apparent until assistance and hazard assessment have been completed				
2. Ensure proper pig is available	Check condition and size				
3. Proceed to the pig sender barrel	Watch for uneven ground and slippery surfaces				
4. Check to see that the bypass valve is open	Proper maintenance of valves				
5. Shut inlet and outlet valves of the pig barrel	Proper maintenance of valves				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Bleed the pig barrel down through the drain	Watch for unusual releases of produced product				
7. Inform downstream operations that you are going to launch the pig	Look and listen when it is non-closed system. Use proper PPE				
8. Open vent and check for pressure	If there is pressure determine the amount of pressure and determine if safe to proceed. If the pressure is excessive stop work and repair as necessary. If the pressure is not excessive then proceed with caution. Use proper PPE				
9. Ensure no-pressure is on the big barrel	Listen for any types of pressure release. Use proper PPE				
10. Proceed to open the pig barrel using the proper cap wrench to complete this tisk	Stand to the side of pig barrel. Use proper PPE				
11. Remove cap slowly	Stand to the side of pig barrel. Use proper PPE				
12. Once cap is removed insert pig	Stand to the side of pig barrel. Use proper PPE				
13. Ensure pig is seated	Replace "O" ring if necessary. If "O"ring is in good condition; grease and install				
14. Inspect cap "O" ring	Use proper thread gauge and proper PPE (gloves)				
15. Check threads on both the cap and pig barrel	**DO NOT OVER TIGHTEN**				
16. Install cap	Use proper PPE				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
17. Close vents and drains and install plugs	Proper maintenance of valves				
18. Open downstream valve on the pig barrel	Proper maintenance of valves				
19. Open upstram valve slowly	Strains opening stiff valves. Ensure no leaks on piping				
20. Close bypass valve	Stand to the side of pig barrel				
21. Confirm that pig has left sender	Proper maintenance of valves				
22. Open bypass valve	Proper maintenance of valves				
23. Isolate the pig barrel	Ensure no leaks on piping. Use proper PPE				
24. Bleed the pig barrel down through the drain	Follow the opening procedure, never look directly into the barrel, use the proper tool to ensure the pig is not in the barrel. Use proper PPE				
25. Open the pig barrel	If pig has launched, job is complete				
26. Replace cap	If pig has not launched, reinstall cap and complete launch steps again. Once the procedure has been completed than recheck for pig launch.				

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Job Safety Analysis (JSA) Worksheet

Task: Pumpjack Belt Replacement			**Procedure #: 3.6.16**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.16**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**		

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Belt			Gloves		This is to be completed as a two man job		
Wrenchs							
Rags							
Lubrication for slides							

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Lockout energy source	None	**Low**	None	**Low**	
2. Set brake	Pinches, slips	**Low**	Gloves	**Low**	
		Low	Correct hand positioning	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Ensure brake is holding	None	**Low**	None	**Low**	
4. Remove required guards	Strains, sprains	**Med**	Use correct lifting techniques	**Low**	
5. Loosen motor mount bolts and slide motor forward	Pinches	**Low**	Be aware of hand positioning	**Low**	
	Strains, sprains	**Low**	Use correct tools	**Low**	
6. Remove belts	Pinches	**Med**	Be aware of hand positioning	**Low**	
	Strains	**Med**	Use correct tools, and assistance	**Low**	
7. Check sheaves for wear. Replace if necessary	Cuts	**Low**	Use gloves while checking sheaves	**Low**	
8. Install first belt on the large sheave on the inside groove and then install the belt on the small sheave on	Slips, falls	**Med**	Use correct body positioning	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
groove and then install the belt on the small sheave on the cooresponding groove	Cuts	**Med**	Use gloves	**Low**	
9. Continue to install the rest of the belts following the above format	Slips, falls	**Med**	Use correct body positioning	**Low**	
10. Once all belts are installed, tighten them until all slack is removed. The belts must be tight but not overally tightened	cuts	**Med**	Use gloves	**Low**	
11. Check alignment	Slips, falls	**Low**	Use proper body positioning	**Low**	
12. If alignment is good, proceed to step #13, if not realign	Slips, falls	**Low**	Use proper body positioning	**Low**	
	Strains, sprains	**Med**	Use correct lifting techniques	**Low**	
13. Replace guards	Slips, falls	**Med**	Use proper body positioning	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
	Cuts, bruises	**Low**	Use gloves	**Low**	
14. Release brake	Strains, sprains	**Low**	Use proper body positioning	**Low**	
15. Prepare energy source for startup	None	**Low**	None	**Low**	
16. Start energy source	Strains, sprains	**Med**	Use proper body positioning	**Low**	The hazards are related to starting a gas engine

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Task Work Procedure

Task: Pumpjack Belt Replacement			**Procedure #: 3.6.16**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.16**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Belt			Gloves		This is to be completed as a two man job	
Wrenchs						
Rags						
Lubrication for slides						

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Lockout energy source	None				
2. Set brake	Gloves				
	Correct hand positioning				
3. Ensure brake is holding	None				
4. Remove required guards	Use correct lifting techniques				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Loosen motor mount bolts and slide motor forward	Be aware of hand positioning				
	Use correct tools				
6. Remove belts	Be aware of hand positioning				
	Use correct tools, and assistance				
7. Check sheaves for wear. Replace if necessary	Use gloves while checking sheaves				
8. Install first belt on the large sheave on the inside groove and then install the belt on the small sheave on the cooresponding groove	Use correct body positioning				
	Use gloves				
9. Continue to install the rest of the belts following the above format	Use correct body positioning				
10. Once all belts are installed, tighten them until all slack is removed. The belts must be tight but not overally tightened	Use gloves				
11. Check alignment	Use proper body positioning				
12. If alignment is good, proceed to step #13, if not realign	Use proper body positioning				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
13. Replace guards	Use correct lifting techniques				
	Use proper body positioning				
	Use gloves				
14. Release brake	Use proper body positioning				
15. Prepare energy source for startup	None				
16. Start energy source	Use proper body positioning				

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Job Safety Analysis (JSA) Worksheet

Task: Purging			**Procedure #: 3.6.17**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.17**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**		

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		
Wrenchs							**Task Risk Rating Outcome:**
Hoses							
Purging Agent							

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure equipment is isolated	Trapped pressure, gas release, H2S	**High**	Follow LOTO Procedure	**Low**	
2. Attach hoses as required	Slips, trips and falls	**Low**	Body positioning	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Depressure system	Trapped pressure, gas release, H2S	**High**	Body positioning,wind direction, personal monitors, proper ventilation	**Low**	
4. Introduce purge medium	Pressure build-up, LEL, O2 Deficient	**High**	Gauges installed, purging monitor, personal monitor, wind direction	**Low**	
5. Monitor purge medium to proper levels e.g. zero O2	LEL, O2 Deficient	**High**	Gauges installed, purging monitor, personal monitor, wind direction	**Low**	
6. Contuine purge for appropriate time e.g 15 minutes for vessels	LEL, O2 Deficient	**High**	Gauges installed, purging monitor, personal monitor, wind direction	**Low**	
7. Close inlet/ outlet	Trapped pressure, gas release, H2S	**High**	Close valves in correct sequence i.e. inlet first. Gauges installed, purging monitor, personal monitor, wind direction	**Low**	

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Task Work Procedure

Task: Purging			**Procedure #: 3.6.17**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.17**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Wrenchs						
Hoses						
Purging Agent						

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure equipment is isolated	Follow LOTO Procedure				
2. Attach hoses as required	Body positioning				
3. Depressure system	Body positioning,wind direction, personal monitors, proper ventilation				
4. Introduce purge medium	Gauges installed, purging monitor, personal monitor, wind direction				
5. Monitor purge medium to proper levels e.g. zero O2	Gauges installed, purging monitor, personal monitor, wind direction				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Contuine purge for appropriate time e.g 15 minutes for vessels	Gauges installed, purging monitor, personal monitor, wind direction				
7. Close inlet/ outlet	Close valves in correct sequence i.e. inlet first. Gauges installed, purging monitor, personal monitor, wind direction				

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Job Safety Analysis (JSA) Worksheet

Task: Removing Orifice Plate - Daniels Senior			**Procedure #: 3.6.18**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.18**		**Sour Site: NO**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team						
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**			

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Grease Sticks	Daniels's Wrench				Adjustable Wrench		
Orifice Plates	Spare Gasket/ Material				Slips, trips and falls		
Clean Rags					Venting		
Pail					Building Entry Procedure		

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Check for leaks	Exposure to toxic substances	**Low**	Monitors	**Low**	
2. Ensure bleedoff is closed	Gas release	**Low**	Monitors	**Low**	This is providing the vent is closed & parking does not fail

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
3. Ensure door cover is secure, bolts tight	Exposure to toxic substances	**Low**	Monitors	**Low**	
4. Equalize	Exposure to toxic substances	**Low**	Monitors	**Low**	
	Pressure release, bad door gasket	**Med**	Check door is secure	**Low**	
5. Open the gate	Hand injury	**Low**	Gloves	**Low**	Wrench slips
6. Roll out plate	Hand injury	**Low**	Gloves	**Low**	Wrench slips
7. Close gate	Hand injury	**Low**	Gloves	**Low**	Wrench slips
8. Grease	N/A	**Low**	Gloves	**Low**	
9. Close equalizer	Hand injury	**Low**	Gloves	**Low**	Wrench slips

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
10. Bleed off, open bleed	Exposure to toxic substances	**Med**	Monitors	**Low**	
	Exposure to pressure	**Med**	Stand away from vent pipe	**Low**	Ensure pressure bled off, prior to moving to nest step
		Med	Open bleed slowly	**Low**	
11. Loosen door bolts slowly	Exposure to toxic substances	**High**	Monitors	**Low**	
	Exposure to pressure	**Low**	Stand aside from gate	**Low**	Be aware, bleed can plug off
12. Nudge plate carrier against door to break seal off gasket	Exposure to toxic substances	**High**		**Low**	This is to check to see if there is pressure inside changer
	Exposure to pressure	**High**		**Low**	
13. Remove door plate and gasket	Exposure to toxic substances	**Med**		**Low**	Ensure there is no pressure
14. Remove plate and carrier from charger, roll out	Exposure to toxic substances	**Med**		**Low**	
15. Inspect plate, rubber carrier, gasket, carrier	Exposure to toxic substances	**Low**		**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
16. Was orifice installed correctly?	N/A	**Low**		**Low**	Bevel goes down

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Task Work Procedure

Task: Removing Orifice Plate - Daniels Senior			**Procedure #: 3.6.18**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.18**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Grease Sticks	Daniels's Wrench				Adjustment Wrench	
Orifice Plates	Spare Gasket/ Material				Slips, trips and falls	
Clean Rags					Venting	
Pail					Building Entry Procedure	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Check for leaks	Monitors				
2. Ensure bleedoff is closed	Monitors				
3. Ensure door cover is secure, bolts tight	Monitors				
4. Equalize	Monitors				
	Check door is secure				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Open the gate	Gloves				
6. Roll out plate	Gloves				
7. Close gate	Gloves				
8. Grease	Gloves				
9. Close equalizer	Gloves				
10. Bleed off, open bleed	Monitors				
	Stand away from vent pipe				
	Open bleed slowly				
11. Loosen door bolts slowly	Monitors				
	Stand aside from gate				
12. Nudge plate carrier against door to break seal off gasket					

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
13. Remove door plate and gasket					
14. Remove plate and carrier from charger, roll out					
15. Inspect plate, rubber carrier, gasket, carrier					
16. Was orifice installed correctly?					

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Job Safety Analysis (JSA) Worksheet

Task: Removing Orifice Plate - Daniels Senior Sour			**Procedure #: 3.6.19**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.19**		**Sour Site: YES**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**

If not, who else needs to be consulted:

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Grease Sticks	Daniels's Wrench		SABA/SCBA		Adjustable Wrench	
Orifice Plates	Spare Gasket/ Material				Slips, trips and falls	
Clean Rags					Venting	
Pail					Building Entry Procedure	

Task Risk Rating Outcome:

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Check for leaks	Exposure to toxic substances	**Low**	Monitors	**Low**	Don Breathing apparatus and appropiate PPE
2. Ensure bleedoff is closed	Gas release	**Low**	Monitors	**Low**	This is providing the vent is closed & packing does not fail

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
3. Ensure door cover is secure, bolts tight	Exposure to toxic substances	**Low**	Monitors	**Low**	
4. Equalize	Exposure to toxic substances	**Low**	Monitors	**Low**	
	Pressure release, bad door gasket	**Med**	Check door is secure	**Low**	
5. Open the gate	Hand injury	**Low**	Gloves	**Low**	Wrench slips
6. Roll out plate	Hand injury	**Low**	Gloves	**Low**	Wrench slips
7. Close gate	Hand injury	**Low**	Gloves	**Low**	Wrench slips
8. Grease	N/A	**Low**	Gloves	**Low**	
9. Close equalizer	Hand injury	**Low**	Gloves	**Low**	Wrench slips

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
10. Bleed off, open bleed	Exposure to toxic substances	**Med**	Monitors, Breathing apparatus	**Low**	
	Exposure to pressure	**Med**	Stand away from vent pipe	**Low**	Ensure pressure bled off, prior to moving to next step
		Med	Open bleed slowly	**Low**	
11. Loosen door bolts slowly	Exposure to toxic substances	**High**	Monitors, Breathing apparatus	**Low**	
	Exposure to pressure	**Low**	Stand aside from gate	**Low**	Be aware, bleed can plug off
12. Nudge plate carrier against door break seal of gasket	Exposure to toxic substances	**High**	Proper PPE	**Low**	This is to check to see if there is pressure inside changer
	Exposure to pressure	**High**	Proper PPE	**Low**	
13. Remore door plate and gasket	Exposure to toxic substances	**Med**	Proper PPE	**Low**	Ensure there is no pressure
14. Remove plate and carrier from changer, roll out	Exposure to toxic substances	**Med**	Proper PPE	**Low**	
15. Inspect plate, rubber carrier, gasket, carrier	Exposure to toxic substances	**Low**	Proper PPE	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
16. Was orifice installed correctly?	None	**Low**	Proper PPE	**Low**	Bevel goes down

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Task Work Procedure

Task: Removing Orifice Plate - Daniels Senior Sour			**Procedure #: 3.6.19**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.19**		**Sour Site: YES**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Grease Sticks	Daniels's Wrench		SABA/SCBA		Adjustment Wrench	
Orifice Plates	Spare Gasket/ Material				Slips, trips and falls	
Clean Rags					Venting	
Pail					Building Entry Procedure	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Check for leaks	Monitors				
2. Ensure bleedoff is closed	Monitors				
3. Ensure door cover is secure, bolts tight	Monitors				
4. Equalize	Monitors				
	Check door is secure				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
5. Open the gate	Gloves				
6. Roll out plate	Gloves				
7. Close gate	Gloves				
8. Grease	Gloves				
9. Close equalizer	Gloves				
10. Bleed off, open bleed	Monitors, Breathing apparatus				
	Stand away from vent pipe				
	Open bleed slowly				
11. Loosen door bolts slowly	Monitors, Breathing apparatus				
	Stand aside from gate				
12. Nudge plate carrier against door break seal of gasket	Proper PPE				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
13. Remore door plate and gasket	Proper PPE				
14. Remove plate and carrier from changer, roll out	Proper PPE				
15. Inspect plate, rubber carrier, gasket, carrier	Proper PPE				
16. Was orifice installed correctly?	Proper PPE				

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Job Safety Analysis (JSA) Worksheet

Task: Sheave Change for Screw Pump (Motor)			**Procedure #: 3.6.20**			
Date of issue: Sept 11, 2009	**HAA No: 3.6.20**		**Sour Site: ALL**			
Department: Operations	**Location: ALL**		**Page 1 of 1**			
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team						
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Name:	**Title:**	**Date:**				
Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**			

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**
Wrenches	Level/ String line				Type of Drive		
Sheaver Puller	Replacement Sheave						
Step Ladder							
Hand files							

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Shut off power supply and lock out	Stored energy, secondary power supply, rotating equip., uncontrolled back spin	**High**	Follow correct LOTO procedure, stay clear of area until unit stops, slowunit down with VFD if available, bump test to ensure isolation	**Low**	
2. If applicable, back off brake assembly	Rotating equip. possible uncontrolled back spin	**High**	Stay safe distance until rotation stops	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Close tubing valve and lock out valve	Slips, trips and sprains	**Low**	Proper body positioning	**Low**	
4. Open or remove belt guard	Pinch points/ snags, strains, stored energy	**Med**	Body positioning, ergonomics - use proper lifting techniques	**Low**	
5. Loosen and remove belts	Pinch points, strains, stored energy	**High**	Body positioning, ergonomics - use proper handling techniques, hand positioning	**Low**	
6. Loosen and remove sheave and hub	Pinch points, strains	**Low**	Body positioning, ergonomics - use proper handling techniques, hand positioning, proper tools	**Low**	
7. Install, line up, and tighten sheave to hub	Pinch points, strains	**Low**	Body positioning, ergonomics - use proper handling techniques, hand positioning, proper tools	**Low**	
8. Install belts and tighten belts	Pinch points, strains, stored energy	**Med**	Body positioning, ergonomics - use proper handling techniques, hand positioning	**Low**	
9. Install belt guard	Pinch points/ snags, strains, stored energy	**Med**	Body positioning, ergonomics - use proper lifting techniques	**Low**	
10. Open valve on wellhead	Possible pressure, stored energy, back spin	**Med**	Positioning	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
11. If applicable, reset brake assembly as per manf. Specs.	Possible pressure, stored energy, back spin	**Med**	Positioning	**Low**	

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Task Work Procedure

Task: Sheave Change for Screw Pump (Motor)			**Procedure #: 3.6.20**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.20**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Wrenches	Level/ String line				Type of Drive	
Sheaver Puller	Replacement Sheave					
Step Ladder						
Hand files						

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Shut off power supply and lock out	Follow correct LOTO procedure, stay clear of area until unit stops, slowunit down with VFD if available, bump test to ensure isolation				
2. If applicable, back off brake assembly	Stay safe distance until rotation stops				
3. Close tubing valve and lock out valve	Proper body positioning				
4. Open or remove belt guard	Body positioning, ergonomics - use proper lifting techniques				
5. Loosen and remove belts	Body positioning, ergonomics - use proper handling techniques, hand positioning				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Loosen and remove sheave and hub	Body positioning, ergonomics - use proper handling techniques, hand positioning, proper tools				
7. Install, line up, and tighten sheave to hub	Body positioning, ergonomics - use proper handling techniques, hand positioning, proper tools				
8. Install belts and tighten belts	Body positioning, ergonomics - use proper handling techniques, hand positioning				
9. Install belt guard	Body positioning, ergonomics - use proper lifting techniques				
10. Open valve on wellhead	Positioning				
11. If applicable, reset brake assembly as per manf. Specs.	Positioning				

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Job Safety Analysis (JSA) Worksheet

Task: Shooting Fluid Levels			**Procedure #: 3.6.21**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.21**		**Sour Site: NO**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		**Task Risk Rating Outcome:**

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure tie-in valve is closed. (Installation Point) Determine if pumping equipment needs to be shut off	Strains, slips and falls	**Low**	Use proper body position (i.e. stand to side of valve etc.)	**Low**	
2. Complete hazard assessment, Bleed off pressure between plug and tie-in valve	Pressure, gas, emulsion, hit by bull plug, exposure to LEL	**Med**	May not be possible if no tapped bull plug in place (see next step). Follow ERCB Directive (venting)	**Low**	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
3. Slowly remove bull plug and/or equipment from the tie-in valve ensuring no trapped pressure	Pressure, gas, emulsion, hit by bull plug, strains, slips and falls	**High**	"CAREFULLY", as there may be trapped pressure. Therefore loosen bull plug and carefully remove while trying to de-pressure through threads	**Low**	
4. Ensure fluid level equipment is operational, Install fluid level recording equipment	Strains, pinches and falls	**Low**	Use proper body position & proper tools	**Low**	
5. Open tie-in valve and take pressure reading (off fluid level gun gauge)	Pressure, strains, leak points on gun, possible explosion if csg on vacuum (cartridge gun)	**High**	"Do not shoot fluid level gun if tie-in point is on vacuum"	**Low**	
6. Close production side valve	Strains, slips, trips and falls	**Low**	Watch body position and watch for tight valves	**Low**	
7. Operate fluid level gun as per Manufactures Procedure (Shoot fluid level)	Unstable nitrogen/ carbon monoxide bottle	**High**	"Do NOT shoot fluid level gun if tie-in point is on vacuum". "Do NOT shoot fluid level if well is not producing gas up csg when powder fired (cartridges) guns" Secure bottles	**Low**	
8. Close tie-in valve. Installation point	Strains, slips, trips and falls	**Low**	Watch body position and watch for tight valves	**Low**	
9. Open bypass valve on the fluid level gun to bleed off pressure	Strains, slips, trips and falls	**Low**	Watch body position and watch for tight valves	**Low**	
10. Remove fluid level recording equipment	Strains, slips, trips and falls	**Low**	Watch body position and watch for tight valves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
11. Install original equipment into the tie-in valve	Strains, slips, trips and falls	**Low**	Watch body position and watch for tight valves	**Low**	
12. Return production side valve to normal operating position	Strains, slips, trips and falls	**Low**	Watch body position and watch for tight valves	**Low**	
13. Interpret the chart recording (count the collar kicks to the fluid level kick) and record all the information of the fluid level shot	None	**Low**	None	**Low**	

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Task Work Procedure

Task: Shooting Fluid Levels		Procedure #: 3.6.21			
Date of issue: Sept 11, 2009	HAA No: 3.6.21	Sour Site: NO			
Department: Operations	Location: ALL	Page 1 of 1			
Revised By:	Revision Date:	JSA Risk Rating:	Low	Medium	High

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure tie-in valve is closed. (Installation Point) Determine if pumping equipment needs to be shut off	Use proper body position (i.e. stand to side of valve etc.)				
2. Complete hazard assessment, Bleed off pressure between plug and tie-in valve	May not be possible if no tapped bull plug in place (see next step). Follow ERCB Directive (venting)				
3. Slowly remove bull plug and/or equipment from the tie-in valve ensuring no trapped pressure	"CAREFULLY", as there may be trapped pressure. Therefore loosen bull plug and carefully remove while trying to de-pressure through threads				
4. Ensure fluid level equipment is operational, Install fluid level recording equipment	Use proper body position & proper tools				
5. Open tie-in valve and take pressure reading (off fluid level gun gauge)	"Do not shoot fluid level gun if tie-in point is on vacuum"				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Close production side valve	Watch body position and watch for tight valves				
7. Operate fluid level gun as per Manufactures Procedure (Shoot fluid level)	"Do NOT shoot fluid level gun if tie-in point is on vacuum". "Do NOT shoot fluid level if well is not producing gas up csg when powder fired (cartridges) guns" Secure bottles				
8. Close tie-in valve. Installation point	Watch body position and watch for tight valves				
9. Open bypass valve on the fluid level gun to bleed off pressure	Watch body position and watch for tight valves				
10. Remove fluid level recording equipment	Watch body position and watch for tight valves				
11. Install original equipment into the tie-in valve	Watch body position and watch for tight valves				
12. Return production side valve to normal operating position	Watch body position and watch for tight valves				
13. Interpret the chart recording (count the collar kicks to the fluid level kick) and record all the information of the fluid level shot	None				

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Job Safety Analysis (JSA) Worksheet

Task: Shooting Fluid Levels - Sour			Procedure #: 3.6.22		
Date of issue: Sept 11, 2009	HAA No: 3.6.22		Sour Site: YES		
Department: Operations	Location: ALL		Page 1 of 1		
Revised By:	Revision Date:		JSA Risk Rating:	Low	Medium	High

JSA Variation Team		
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:
Name:	Title:	Date:

Does the team have the necessary expertise to complete the assessment?	Yes	No	If not, who else needs to be consulted:

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations		Task Risk Rating Outcome:

Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Ensure tie-in valve is closed. (Installation Point) Determine if pumping equipment needs to be shut off	Strains, slips and falls	Med	Use proper body position (i.e. stand to side of valve etc.)	Low	
2. Complete hazard assessment. Don breathing apparatus if exposure will exceed OEL. Bleed off pressure between plug and tie-in valve	Pressure, gas, emulsion, hit by bull plug, exposure to LEL, H2S	High	May not be possible if no tapped bull plug in place (see next step). Follow ERCB Directive (venting)	Low	

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Sequence of Steps (List basic steps of the job)	Potential Hazards (potential hazards if there are no controls in place)	Risk Rank each hazard Low, Med, High	Required Hazard Control(s)	Re Risk Rank each hazard Low, Med, High	Description of Additional/ Required Control(s) (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
3. Slowly remove bull plug and/ or equipment from the tie-in valve ensuring no trapped pressure	Pressure, gas, emulsion, hit by bull plug, strains, slips and falls	**High**	"CAREFULLY", as there may be trapped pressure. Therefore loosen bull plug and carefully remove while trying to de-pressure through threads. Stand to side of plug, monitor for LEL. Inspect valve for thread integrity	**Low**	
4. Ensure fluid level equipment is operational. Install fluid level recording equipment	Strains, pinches and falls	**Med**	Use proper body position & proper tools	**Low**	
5. Open tie-in valve and take pressure reading (Off fluid level gun gauge)	Pressure, strains, leak points on gun, possible explosion if csg on vacuum (cartridge gun)	**High**	"Do not shoot fluid level gun if tie-in point is on vacuum"	**Low**	
6. Close production side valve	Strains, slips , trips and falls	**Low**	Watch body position and for tight valves	**Low**	
7. Operate fluid level gun as per Manufactures procedure (shoot fluid level)	Unstable nitrogen/ carbon monoxide bottle	**High**	"Do not shoot fluid level gun if tie-in point is on vacuum". "Do not shoot fluid level if well is not producing gas up csg when powder fired (cartridges) gun". Secure bottles	**Low**	
8. Close tie-in valve. Installation point	Strains, slips , trips and falls	**Low**	Watch body position and for tight valves	**Low**	
9. Open bypass valve on the fluid level gun to bleed off pressure	Strains, slips , trips and falls	**Med**	Watch body position and for tight valves	**Low**	
10. Remove fluid level recording equipment	Strains, slips , trips and falls	**Low**	Watch body position and for tight valves	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
11. Remove breathing apparatue. Install original equipment into the tie-in valve	Strains, slips , trips and falls	**Low**	Watch body position and for tight valves	**Low**	
12. Return production side valve to normal operating position	Strains, slips , trips and falls	**Low**	Watch body position and for tight valves	**Low**	
13. Interpret chat recording (count the collar kicks to the fluid level kick) and record all the information of the fluid level shot	None	**Low**	None	**Low**	

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Task Work Procedure

Task: Shooting Fluid Levels - Sour		Procedure #: 3.6.22			
Date of issue: Sept 11, 2009	HAA No: 3.6.22	Sour Site: YES			
Department: Operations	Location: ALL	Page 1 of 1			
Revised By:	Revision Date:	JSA Risk Rating:	Low	Medium	High

Tools, Equipment, Materials Required:			Additional PPE Required		Other considerations	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Ensure tie-in valve is closed. (Installation Point) Determine if pumping equipment needs to be shut off	Use proper body position (i.e. stand to side of valve etc.)				
2. Complete hazard assessment. Don breathing apparatus if exposure will exceed OEL. Bleed off pressure between plug and tie-in valve	May not be possible if no tapped bull plug in place (see next step). Follow ERCB Directive (venting)				
3. Slowly remove bull plug and/ or equipment from the tie-in valve ensuring no trapped pressure	"CAREFULLY", as there may be trapped pressure. Therefore loosen bull plug and carefully remove while trying to de-pressure through threads. Stand to side of plug, monitor for LEL. Inspect valve for thread integrity				
4. Ensure fluid level equipment is operational. Install fluid level recording equipment	Use proper body position & proper tools				
5. Open tie-in valve and take pressure reading (Off fluid level gun gauge)	"Do not shoot fluid level gun if tie-in point is on vacuum"				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. Close production side valve	Watch body position and for tight valves				
7. Operate fluid level gun as per Manufactures procedure (shoot fluid level)	"Do not shoot fluid level gun if tie-in point is on vacuum". "Do not shoot fluid level if well is not producing gas up csg when powder fired (cartridges) gun". Secure bottles				
8. Close tie-in valve. Installation point	Watch body position and for tight valves				
9. Open bypass valve on the fluid level gun to bleed off pressure	Watch body position and for tight valves				
10. Remove fluid level recording equipment	Watch body position and for tight valves				
11. Remove breathing apparatue. Install original equipment into the tie-in valve	Watch body position and for tight valves				
12. Return production side valve to normal operating position	Watch body position and for tight valves				
13. Interpret chat recording (count the collar kicks to the fluid level kick) and record all the information of the fluid level shot	None				

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Job Safety Analysis (JSA) Worksheet

Task: Towing (Vehicle Recovery)			**Procedure #: 3.6.23**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.23**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**
JSA Variation Team					
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			
Name:	**Title:**	**Date:**			

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		
Engineered Vehicle Recovery Kit			High visibility vest		Traffic control		**Task Risk Rating Outcome:**
Shovel					Size of vehicle to be towed		
					Correct hook up points		

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Assess the situation and ensure that your vehicle is capable of extracting the stuck vehicle	Injuries, vehicle damage, becoming stuck yourself	**High**	Never attempt to extract a vehicle larger than your own, assess the situation	**Low**	
2. Position truck to the vehicle that needs assistance	Sliding into vehicle, injuring people between vehicles, other traffic, ground conditions	**High**	Traffic spotter if reqd. body positioning, footing, aware of surroundings	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Using your Engineered Vehicle Recovery Kit connect your vehicles	Personal injury, property damage resulting from traffic, incorrect connection, and vehicle positions	**High**	Traffic spotter if reqd. body positioning, footing, aware of surroundings, engineered vehicle recovery kit	**Low**	
4. Coordinate signals with other driver	Driver may not be ready resulting in injury and equipment failure	**High**	Confirm signal/ communication	**Low**	
5. Pull ahead slowly and take slack out of tow strap	If slack is not taken out could result in injury or damage	**High**	Confirm signal/ communication	**Low**	
6. When ready, accelerate slowly and extract vehicle	Pulling too hard/ fast could result in damage or injury	**High**	Confirm signal/ communication	**Low**	
7. When vehicle is free back up taking tension off tow strap	Drive on tow strap causing unnecessary strain on vehicle and strap, personnel trapped between vehicles, collision	**High**	Confirm signal/ communication	**Low**	
8. Unhook tow strap, clean and store correctly	Incorrect storage could result in damage to tow strap	**Low**	Follow manufactures storage and cleaning instructions	**Low**	

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Task Work Procedure

Task: Towing (Vehicle Recovery)			**Procedure #: 3.6.23**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.23**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Engineered Vehicle Recovery Kit			High visibility vest		Traffic control	
Shovel					Size of vehicle to be towed	
					Correct hook up points	

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Assess the situation and ensure that your vehicle is capable of extracting the stuck vehicle	Never attempt to extract a vehicle larger than your own, assess the situation				
2. Position truck to the vehicle that needs assistance	Traffic spotter if reqd. body positioning, footing, aware of surroundings				
3. Using your Engineered Vehicle Recovery Kit connect your vehicles	Traffic spotter if reqd. body positioning, footing, aware of surroundings, engineered vehicle recovery kit				
4. Coordinate signals with other driver	Confirm signal/ communication				
5. Pull ahead slowly and take slack out of tow strap	Confirm signal/ communication				

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Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
6. When ready, accelerate slowly and extract vehicle	Confirm signal/ communication				
7. When vehicle is free back up taking tension off tow strap	Confirm signal/ communication				
8. Unhook tow strap, clean and store correctly	Follow manufactures storage and cleaning instructions				

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Job Safety Analysis (JSA) Worksheet

Task: Working Alone			**Procedure #: 3.6.24**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.24**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

JSA Variation Team		
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**
Name:	**Title:**	**Date:**

Does the team have the necessary expertise to complete the assessment?	**Yes**	**No**	**If not, who else needs to be consulted:**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**		
Phones							**Task Risk Rating Outcome:**
2 Way Radios							
Batteries							

Sequence of Steps (List basic steps of the job)	**Potential Hazards** (potential hazards if there are no controls in place)	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** (If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?
1. Check electronic device is working	Communication failure	**High**	Don't proceed to work, use alternate phone of radio	**Low**	
2. Communication with service and establish travel route and check intervals	None	**Low**	None	**Low**	

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Sequence of Steps **(List basic steps of the job)**	**Potential Hazards** **(potential hazards if there are no controls in place)**	**Risk Rank each hazard** Low, Med, High	**Required Hazard Control(s)**	**Re Risk Rank each hazard** Low, Med, High	**Description of Additional/ Required Control(s)** **(If existing controls are not in place or are not adequate to contorl the hazard list the recommended control) If there is a failure on contorl then what?**
3. Preform tasks as per job function	Low risks	**Low**	Refer to applicable JSA	**Low**	
4. Check back at predetemined intervals	None	**Low**	None	**Low**	
5. Check out when no longer working alone	Communication failure	**Low**	Find alternate means of communication-mis check in procedure should start	**Low**	

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Task Work Procedure

Task: Working Alone			**Procedure #: 3.6.24**		
Date of issue: Sept 11, 2009	**HAA No: 3.6.24**		**Sour Site: ALL**		
Department: Operations	**Location: ALL**		**Page 1 of 1**		
Revised By:	**Revision Date:**		**JSA Risk Rating:**	**Low**	**Medium**	**High**

Tools, Equipment, Materials Required:			**Additional PPE Required**		**Other considerations**	
Phones						
2 Way Radios						
Batteries						

Procedure:

Task Steps/ Action	Controls/ Considerations (Manually enter any additional Controls or Considerations not mentioned in the Task Steps section)	Operations Name	Date	Supervisor Initial	Worker Initial
1. Check electronic device is working	Don't proceed to work, use alternate phone of radio				
2. Communication with service and establish travel route and check intervals	None				
3. Preform tasks as per job function	Refer to applicable JSA				
4. Check back at predetemined intervals	None				
5. Check out when no longer working alone	Find alternate means of communication-mis check in procedure should start				

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SITE DETAILS	
LSD	
Latitude:	Longitude:

DIRECTIONS TO SITE:

_____
_____
_____
_____

EMERGENCY CONTACTS	
Name	**Contact Number**
Fire Department	911 or
Police Department	911 or
EMS	911 or
HOC 24 hour emergency number	1-800-760-2826
On-Call EOC Director	403-888-2540
HOC Area Foreman:	
HOC Area Alternate Contact:	
Worksite Supervisor:	
STARS air ambulance	
STARS site registration number	

MUSTER LOCATIONS:

1. _____
2. _____
3. _____

FIRST AID ATTENDENTS
1)
2)
3)

EMERGENCY EQUIPMENT		
Type	**Number**	**Location**
First Aid Supplies		
Respiratory Equipment		
Fire Extinguishers		
Communications Equipment		
Other		

PROCEDURES TO RAISE THE ALARM

_____
_____
_____
_____

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EMERGENCY RESPONSE PLAN FORM

The site supervisor MUST ensure that:

- **This Emergency Response Plan Form is filled in to the fullest extent possible.**
- **This Emergency Response Plan Form is posted in a suitable location on the work site.**
- **The contents of this Emergency Response Plan Form are known to ALL personnel on the work site.**
- **The location of this Emergency Response Plan Form is known to ALL personnel on the work site.**
- **All personnel on site are aware of the evacuation routes depending on the location of the incident and wind direction.**
- **All hazards and potential emergencies on the work site are communicated to ALL personnel on the work site via pre-job safety meetings and/or tailgate safety meetings.**
- **In the event of an emergency situation, the relevant contacts are made. (See the Emergency Contacts Section on the reverse side of this form).**
- **In the event of an emergency situation, appropriate on-site personnel are delegated for rescue purposes DEPENDING ON THE TYPE AND LEVEL OF TRAINING RECEIVED.**

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Harvest OPERATIONS CORP.

EQUIPMENT LOCK OUT / TAG OUT RECORD SHEET

Equipment Name: _____

	Valve / Breaker	Size	Open	Closed	Blinded	Tagged	Locked
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							

Date Isolated: _____

Isolated By: _____

Accepted By Craftsman: _____

Date Re-Energized: _____

Re-Energized By: _____

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Alberta and Saskatchewan Group Lockout Log (for Lock Box)

Project Description:				**Safe Work Agreement No.:**	
				Job Location:	
Procedure Written by:	**Date:**	**Reviewed by:**	**Date:**	**Date:**	**Time**
Procedure Approved by:	**Date:**	**Reviewed by:**	**Date:**	**Safety Watch:**	
Agreement Issuer:		**Signature:**		**In Saskatchewan:** Double/Block/Bleed Lockout inspection **every 1 hour** recorded on the tags and write an explanation for using duplicate keys:	
Responsible Worker:		**Signature:**			

The Agreement issuer is responsible for identifying the "Isolation Points", checking the "Energy Isolation Devices", attaching the "Securing Devices" and "Verifying Isolation".

Isolation Point or Process Component		**Energy Isolating Device** (Break, Blind, or Valve)	**Securing Device**		Verify Isolation	**All Locks Attached by Agreement Issuer or a Designated Responsible Worker** (verification must be initialed by Agreement Issuer)			**All Locks Removed by Agreement Issuer** (or as Indicated Below)		
Location (insert lockout sequence #, if required)	**Locked Position** Open/Closed		**Type** i.e., Lock & Tag	**Lock Id or Blind #**		**Lock/Tag Installed by**:	**Signature**	**Date** dd/mm/yy	**Lock/Tag Removed by:** (identify if cutt-off)	**Initials**	**Date** dd/mm/yy

May 16, 2012

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Alberta and Saskatchewan Group Lockout Log (for Lock Box)

Worker Name	Signature	Position (i.e., Foreman)	Trade	Company	Cell Phone	Lock Removed	
						Date	Initial

Isolation Point means the point (i.e., disconnect switch, circuit breaker or valve) at which an energy-isolation device is attached to the equipment, with the capability of having a lock installed, on in the case of flow-stopping tools (i.e., line stopper tools, pipe squeezers), to prevent the flow of oil or natural gas within the pipeline.

Harvest expects its workers to refuse work on any equipment until it has been bump tested successfully and the Agreement Issuer is certain that it is safe to proceed with the work.

Energy Isolating Device means a device (i.e., disconnect switch, circuit breaker, valve, or block) that can be operated or put into place to prevent the transfer of energy from one side of a device to the other side of the device. Push buttons, selector switches and other control circuit-type devices are not energy-isolated devices for purposes of the practice.

Hazard Assessment all affected workers (i.e., the work crew) must be included in the pre-job hazard assessment and in the control or elimination of those identified hazards. Further, all workers at the work site or at other work sites affected by the lockout or hazards identified in the hazard assessment and Safe Work Agreement (SWA) must be informed of the lockout, the hazards and of the methods used to control or eliminate the hazards.

Group Lockout Using a Lock Box

The Agreement Issuer is assigned the primary responsibility of placing and/or activating the energy-isolated devices (turning off switches, valves, etc.) The Agreement Issuer must:

1. Place a securing device (typically a keyed padlock) and tag on each energy-isolating device.

Note: If required, record lock attachment and removal sequence.

2. Test and confirm lockout, and document that all hazardous energy sources in the group lockout procedure are effectively isolated.
3. Put the key to each securing device in a lock box and attach their personal lock and tag.
4. Each worker involved in the lockout then attaches their own lock and tag to the lock box, thus ensuring that the master key(s) preventing the equipment from being returned to service cannot be removed from the lock box until each worker removes their personal lock and tag.
5. Complete, sign, and post this Lockout Log at the location of the lock box.

British Columbia Group Lockout Log (for Lock Box)

Project Description:				**Safe Work Agreement No.:**	
				Job Location:	
Procedure Written by:	**Date:**	**Reviewed by:**	**Date:**	**Date:**	**Time**
Procedure Approved by:	**Date:**	**Reviewed by:**	**Date:**	**Safety Watch:**	
Agreement Issuer:		**Signature:**		**In British Columbia:** A lockout of double block and bleed is **not** permitted if the adjacent piping **contains** a harmful substance that is a gas, vapour, or liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping.	
Responsible Worker:		**Signature:**			

The Agreement issuer is responsible for identifying the "Isolation Points", checking the "Energy Isolation Devices", attaching the "Securing Devices" and "Verifying Isolation".

Isolation Point or Process Component		**Energy Isolating**	**Securing Device**		**First Lock & Tag Attached by the Agreement Issuer**				**Second Lock & Tag Attached by the Designated Worker**			
Location (insert lockout sequence #, if required)	**Locked Position** Open/Closed	**Device** (Break, Blind, or Valve)	**Type** i.e., Lock and Tag	**Lock Id or Blind #**	**Date Installed** dd/mm/yy	**Lock/Tag Installed by**:	**Signature**	**Date** dd/mm/yy	**Date Installed** dd/mm/yy	**Lock/Tag Removed by:** (identify if cutt-off)	**Initials**	**Date** dd/mm/yy

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British Columbia Group Lockout Log (for Lock Box)

Worker Name	Signature	Position	Trade	Company	Cell Phone	Lock Removed	
						Date	Initial

Isolation Point means the point (i.e., disconnect switch, circuit breaker or valve) at which an energy-isolation device is attached to the equipment, with the capability of having a lock installed, on in the case of flow-stopping tools (i.e., line stopper tools, pipe squeezers), to prevent the flow of oil or natural gas within the pipeline.

Harvest expects its workers to refuse work on any equipment until it has been bump tested successfully and the Agreement Issuer is certain that it is safe to proceed with the work.

Energy Isolating Device means a device (i.e., disconnect switch, circuit breaker, valve, or block) that can be operated or put into place to prevent the transfer of energy from one side of a device to the other side of the device. Push buttons, selector switches and other control circuit-type devices are not energy-isolated devices for purposes of the practice.

Hazard Assessment all affected workers (i.e., the work crew) must be included in the pre-job hazard assessment and in the control or elimination of those identified hazards. Further, all workers at the work site or at other work sites affected by the lockout or hazards identified in the hazard assessment and Safe Work Agreement (SWA) must be informed of the lockout, the hazards and of the methods used to control or eliminate the hazards.

British Columbia Group Lockout Using a Lock Box

The Agreement Issuer is assigned the primary responsibility of placing and/or activating the energy-isolated devices (turning off switches, valves, etc.) The Agreement Issuer will designate a second worker and they both will:

1. Place a securing device (typically a keyed padlock) and tag on each energy-isolating device.

Note: If required, record lock attachment and removal sequence.

2. Test and confirm lockout, and document that all hazardous energy sources in the group lockout procedure are effectively isolated.
3. Put the key to each securing device in a lock box and attach their personal lock and tag.
4. Complete, sign, and post this Lockout Log at the location of the lock box.

Each worker involved in the lockout then attaches their own lock and tag to the lock box, thus ensuring that the master key(s) preventing the equipment from being returned to service cannot be removed from the lock box until each worker removes their personal lock and tag.

LOCK SIGN OUT RECORD SHEET

Lock ID #	Location	Craft	Signed Out	Date Out	Date Returned	Returned By
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						

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Harvest
OPERATIONS CORP.

SUPERVISOR DUPLICATE KEY RECORD SHEET (example)

Lock / Key ID #	Reason for Duplicate Key Issue	Date Key Used	Name of Issuer	Signature of Issuer

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NORM SURVEY FORM

Date:	Surveyor:		
Site / Location:			
Survey Type: Routine; Prior to Turnaround; During Turnaround; Other			
Survey Meter Make / Model:		S/N:	
Probe Make / Model:		S/N:	
Annual Calibration Date: Physical Check: Battery Check:		Radioactive Check Source Reading: Pancake: CPM Scintillator: µSv/hr	
Background Readings →	Inside Bldg. or Outside CPM	Inside Bldg. µSv/hr	Outside Bldg. µSv/hr

ITEM	AREA LOCATION OR EQUIP. DESCRIPTION	CONTAMINATION SURVEY WITH PANCAKE DECTOR CPM @ <1cm NORM = ≥ 200 CPM	GAMMA DOSE RATE READINGS WITH SCINTILLATION DETECTOR µSv/hr on contact NORM = 0.03-0.05	 0.5 µSv/hr @ 0.5 m Action = Inform supervisor

Comments / Area Sketch:

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NOTICE OF WORKSITE SUPERVISOR

Take notice that: **Harvest Operations Corp.**

Hereby Appoints: _____ _____ as the Worksite Supervisor of the following undertaking(s):
(name - print) (phone #)

☐ Drilling ☐ Completions ☐ Construction ☐ Operations

Location of worksite: _____

Describe undertakings allowed for this Worksite Supervisor: _____

_____

_____

During the time period from: ____/ ____/ _____ to: ____/ ____/ _____
(dd) (mm) (yyyy) (dd) (mm) (yyyy)

Alternate Worksite Supervisor: _____ _____
(name - print) (phone#)

The Worksite Supervisor's duties and responsibilities include the following:

☐ Co-ordinate the efforts of all employers at the location
☐ Stop work if an unsafe act or condition is identified
☐ Ensure all incidents and near misses are reported and investigated
☐ Prior to starting any work:
- Provide the site-specific orientation & Hazard Assessment to employers and visitors
- Identify hazards related to the specific location, the planned program, or the materials provided by the prime contractor. Inform all employers of these hazards and ensure proper controls are in place.
- Resolve any discrepancies between safe work procedures.
- Identify and document the name of the on-site supervisor for each employer.
- Review and clarify the roles and responsibilities of all employers and on-site supervisors
- Implement detection and control of Hydrogen Sulfide, flammable substances, and other hazardous gases to prevent harmful exposure of workers or the public.
- Establish and co-ordinate site-specific emergency response procedures.
- Post information, review procedures and conduct practice drills with all personnel on site.

☐ Monitor work activities of all employers and work activities to verify
- Compliance with safety legislation as well as both the employer's and prime contractor's safety program requirements.
- Provision of adequate training and supervision for employees
- Proper use, handling, storage and maintenance of personal protective equipment.
- Procedures for handling, transportation, disposal, storage, and use of all hazardous substances, follow applicable regulations and safe practices.
- Well control and blowout prevention measures meet regulations and operator's requirement

The Worksite Supervisor has the further duty and responsibility to ensure that all work activities within his area of responsibility are adequately and competently supervised at all times. He shall designate a competent person to act as Alternate Worksite Supervisor, and carry out his duties and responsibilities, in his absence. The name of the person designated as Alternate Worksite Supervisor during the absence of the Worksite Supervisor shall be posted at the worksite.

I acknowledge receiving the notice identifying myself as the designated Worksite Supervisor/ Alternate Worksite Supervisor and agree to accept the duties and responsibilities of this position:

Name (print)	**Position**	**Signature**	**Date**
Name (print)	**Position**	**Signature**	**Date**

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NOTICE OF WORKSITE SUPERVISOR

Declaration by the contractor / subcontractor:

- I acknowledge receiving this notice identifying the designated Worksite Supervisor(s) and agree to accept their direction, and the direction of their delegates:
- I agree to comply with Harvest Operations Corp. Health and Safety requirements and procedures, and all applicable regulatory requirements.

Contractor company name (direct): ______________________________

Subcontractor: Yes ☐ No ☐

If yes, write company name: ______________________________

Date	**Position**	**Name (print)**	**Signature**

Declaration by the contractor / subcontractor:

- I acknowledge receiving this notice identifying the designated Worksite Supervisor(s) and agree to accept their direction, and the direction of their delegates:
- I agree to comply with Harvest Operations Corp. Health and Safety requirements and procedures, and all applicable regulatory requirements.

Contractor company name (direct): ______________________________

Subcontractor: Yes ☐ No ☐

If yes, write company name: ______________________________

Date	**Position**	**Name** (print)	**Signature**

Declaration by the contractor / subcontractor:

- I acknowledge receiving this notice identifying the designated Worksite Supervisor(s) and agree to accept their direction, and the direction of their delegates:
- I agree to comply with Harvest Operations Corp. Health and Safety requirements and procedures, and all applicable regulatory requirements.

Contractor company name (direct): ______________________________

Subcontractor: Yes ☐ No ☐

If yes, write company name: ______________________________

Date	**Position**	**Name** (print)	**Signature**

✶ **A copy of the Notice of Worksite Supervisor and Declaration(s) must be kept at the worksite.**

Pipeline and Facilities Record Sheet

Location: _____ **Date:** _____

Pipelines

Owner	License #	Line #	Size	Operating Pressure	Product	From	To

Other Facilities

Owner	Description

Comments:

Signature _____

May 16, 2012

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SUGGESTED INSPECTION / MAINTENANCE CHECKLIST
FOR SELF-CONTAINED BREATHING APPARATUS / SUPPLIED AIR BREATHING APPARATUS

SCBA ☐ **SABA** ☐ (Check One)

TANK SN.			**LOCATION**	
PRIMARY REGULATOR SN.			**IDENTIFICATION NO.**	
LOW PRESSURE REGULATOR SN.			**AIR ANALYSIS RECEIVED**	
HYDRO TEST DATE			**LAST FILLED**	

WEEKLY "EMERGENCY" UNIT INSPECTION

DATE INSPECTED	CYLINDER PRESSURE	INSPECTED BY	DATE INSPECTED	CYLINDER PRESSURE	INSPECTED BY	DATE INSPECTED	CYLINDER PRESSURE	INSPECTED BY

MONTHLY / QUARTERLY (or Manufacturer's Recommended Frequency) INSPECTION / MAINTENANCE CHECKLIST

DATE INSPECTED	HAND CONNECTION TIGHT	ALARM FUNCTION TESTED	REGULATOR OPERATION CHECK	FACE PIECE / EXHALATION VALVE/TUBE OK	CLEANED AND SANITIZED	HARNESS CONDITION	CONDITIONS / REMARKS UNSATISFACTORY	INSPECTED BY

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RESPIRATORY PROTECTION FIT TESTING RECORD

NAME: _____ DATE: _____
WORK LOCATION: _____ TITLE: _____

TYPE OF RESPIRATOR: (Demonstrated use of each?)
- MSA _____
- SCOTT _____
- OTHER _____
- OTHER _____

TEST DONE:
- SMOKE TEST _____
- NEGATIVE PRESSURE _____
- BANANA OIL TEST _____
- QUANTITATIVE _____

TEST RESULTS:
- GOOD _____
- RETEST _____
- FINAL RESULTS _____
- FIT TEST STILL REQUIRED _____

FULL FACE PIECE	S ☐	M ☐	L ☐	XL ☐
HALF FACE PIECE	S ☐	M ☐	L ☐	XL ☐
OTHER, SPECIFY	S ☐	M ☐	L ☐	XL ☐

Do you have any medical or physical condition that makes it difficult for you to effectively and safely use breathing apparatus? ____ Yes ____No

If yes, has a medical evaluation been completed and submitted? ____Yes ____No

If not, why not? _____

COMMENTS: _____

_____ _____
EMPLOYEE SIGNATURE TESTER SIGNATURE

S – Small (green), M – Medium (brown), L – Large (black), XL – X-Large (red)

Employees utilizing respiratory protection must wear the correct size of face piece identified in this table.

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SUGGESTED SABA USAGE LOG

1. **BEFORE EACH USE:** (a) Check that cylinder is completely charged. (b) Check that unit is complete.
2. **AFTER EACH USE:** (a) Recharge cylinder. (b) Check condition of all components. (c) Clean and disinfect face piece. (d) Leak check. (e) Operational check. (f) Log usage.

SABA USAGE LOG

DATE USED	UNIT NO. (Tank SN.) 300 Ft^3	UNIT NO. (Tank SN.) 7.5 Ft^3	UNIT NO. BREATHING REGULATOR	CYLINDER RECHARGE PRESSURE	CONDITION OF COMPONENTS (Regulators, Gauges, Harness, Face piece, Breathing tube, Exhalation valve, etc.)	CLEANED AND SANITIZED	LEAK CHECKED	OPERATIONAL CHECK CONDUCTED	USED BY

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SUGGESTED SCBA USAGE LOG

1. **BEFORE EACH USE:** (a) Check that cylinder is completely charged. (b) Check that unit is complete.
2. **AFTER EACH USE:** (a) Recharge cylinder. (b) Check condition of all components. (c) Clean and disinfect face piece. (d) Leak check. (e) Operational check. (f) Log usage.

SCBA USAGE LOG

DATE USED	UNIT NO. (Tank SN)	UNIT NO. (Breathing Regulator SN)	CYLINDER RECHARGE PRESSURE	CONDITION OF COMPONENTS (Regulators, Gauges, Rubber parts pliable, Harness, Face piece and Tube, Exhalation valve)	CLEANED AND SANITIZED	LEAK CHECKED	OPERATIONAL CHECK CONDUCTED	USED BY

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SAFETY MEETING MINUTES

LOCATION		*Date* *Yr. Mo. Da.*	
Start Time		*Chaired by*	
Stop Time		*Recorded by*	
DAYS SINCE LAST MINOR INJURY		***DAYS SINCE LAST LOST TIME INJURY***	

PRESENT: (*Attach Attendance Sign in Sheet to Minutes, and Update Excel Safety Meeting Attendance Record Sheet*)

ABSENT/REASON:

OLD BUSINESS:

Cut and Paste Business lists from last meeting and "UPDATE" list here with "completed date" when concern/issue resolved. (Carry completed concerns/issues for one meeting to show completed date, then delete from the list).

Discussion:

Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

RECENT EVENT REPORTS: *(Track until follow-up is complete)*

Event Review Discussion:

Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

RECENT INSPECTION REPORTS (Internal / EUB / OH&S, etc) *(Track until follow-up is complete)*

Inspection Review Discussion:

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Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

RECENT HAZARD ID REPORTS *(Track until follow-up is complete)*

Inspection Review Discussion:				
Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

REVIEW OF AREA EH&S PERFORMANCE TRACKER SCORES

Discussion:				
Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

NEW BUSINESS: (New Issues, New Alerts, New Bulletins)

Discussion:				
Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

SAFETY/ENVIRONMENTAL MEETING TOPIC:

Topic from Manual(s) Discussion:				
Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

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SAFETY/TRAINING – CORE COURSES - MEETING TOPIC:

Courses Due - Discussion:				
Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

Other Presentations:

Discussion:				
Issues / Action Identified	**Action Taken**	**Responsibility**	**Target Date**	**Completed Date**

Next Meeting Date:		*Start Time:*		*Chairperson:*	
Next Meeting Topic:					

DISTRIBUTION/SIGN OFF

Field Supervisor:		*Safety:*	
Superintendent:		*Other:*	
Manager:		*Return to Field File:*	

COMPLETE AND ATTACH ATTENDANCE RECORD TO SAFETY MEETING MINUTES FOR TRACKING (SafMtgAttend0602)

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TEMPORARY WORK ACCOMMODATION FORM

Harvest Operations Corp. supports a policy on return to work by providing meaningful temporary workplace accommodations during recovery from a work related illness / injury whenever possible.

A. EMPLOYEE RELEASE:

EMPLOYEE NAME: _____ (Please print) JOB TITLE: _____

SUPERVISOR: _____ (Please print) DATE: _____

I authorize the release of information pertaining to this injury / illness to the Human Resources Department at Harvest for the purpose of assisting in developing temporary workplace accommodation(s), if required.

EMPLOYEE SIGNATURE: _____ (Signature) DATE: _____

B. TO BE COMPLETED BY PHYSICAN:

As the attending physician, we ask you to provide Harvest with the appropriate information to assist us in our endeavors to provide safe and effective accommodation(s) for our employees.

ILLNESS / INJURY DATE: _____ WCB PHYSICIAN REPORT COMPLETED: Yes / No

EMPLOYEE CAN RETURN TO THEIR REGULAR DUTIES: Yes / No

EMPLOYEE REQUIRES TEMPORARY WORKPLACE ACCOMMODATION: Yes / No

DETAILS OF ACCOMMODATION(S):

JOB ACTIVITIES:	LIMITATIONS / RESTRICTIONS:	DURATION:
Cognitive		
Hours/ Days		
Sitting		
Walking		
Bending		
Pulling		
Lifting/ Carrying		
Driving		
Climbing		
Other (please specify)		

ADDITIONAL COMMENTS: _____

Date of Scheduled Visit: _____ Physician's Signature:	Date: _____ Physician's Name & Address:
PLEASE RETURN THE COMPLETED FORM TO THE PATIENT OR FAX TO HR's CONFIDENTIAL FAX # 1-403-263-9150	

Harvest employees and their dependent family members have access to a full range of health and wellness services as part of our benefits package provided under the Employee and Family Assistance Program (EFAP). Human Solutions is available to help anytime, day or night, 365 days of the year (1-800-663-1142 or email www.humansolutions.ca).

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COMPLETING THE TEMPORARY WORK ACCOMMODATION FORM

PURPOSE

This form is to be completed at the earliest opportunity following a workplace incident / accident which has lead to illness or injury where medical attention was required. It also needs to be completed when an employee has to take time off as a result of the above situation and requires temporary work accommodation(s) when returning to the workplace.

COMPLETING THE FORM

A. EMPLOYEE RELEASE:

Where there is a reasonable expectation that the workplace illness / injury will lead to time off work, the injured employee is required to have the attending physician complete the Temporary Work Accommodation Form. In order to accommodate an employee in this situation, the employee must sign the form, authorizing Harvest to access medical information for the purpose of providing meaningful temporary workplace accommodation(s) during recovery from a work related illness / injury.

Please Note:

- It is the employee's responsibility to attend follow up visits as required until the physician completes Section B of this form indicating that the employee can return to regular duties.

B. PHYSICIAN:

The physician is to indicate the date of the illness / injury, filing of a WCB claim, if the employee can return to regular duties and the specific limitations / restrictions of a return to work plan if temporary accommodation is required. For each category, the physician must indicate the estimated duration of the accommodation. The physician is required to sign and date the completed form, provide his/her contact details and fax it to the confidential number provided at the bottom of the form.

Limitations / restrictions related to cognitive activities will likely require restrictions not listed on the form. Space has been provided at the bottom of the chart in the comments section for this purpose.

Please Note:

- Follow up with a physician is required if accommodation(s) are listed.
- This form must be completed by the physician and re-submitted when the employee is deemed fit to return to regular duties with no limitations / restrictions.

C. SUPERVISOR:

HR will review limitations / restrictions with the applicable supervisor to ensure the business unit can provide the physician recommended workplace accommodation(s). Follow up visits are required until the physician completes Section B of this form indicating that the employee can return to regular duties.

DIRECT QUESTIONS REGARDING THE FORM TO:

Renee Emond, HR Advisor **| Phone**: 403-261-822 **| Fax**: 403.263-9150 **| Email**: renee.emond@harvestenergy.ca

In the event of a workplace illness / injury please notify the HR Department at the first available opportunity in order for Harvest to provide the required paperwork to the Worker's Compensation Board within the (72 hour) required timeframe.

EMPLOYEE & FAMILY ASSISTANCE

Harvest employees and their dependent family members have access to a full range of health and wellness services as part of our benefits package provided under the Employee and Family Assistance Program (EFAP). Human Solutions is available to help anytime, day or night, 365 days of the year (1-800-663-1142 or email www.humansolutions.ca).

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Site – Specific Fall Protection Plan

(Attach to Safe Work Agreement)

1.			
Job Location	**Sour** ☐ **or Sweet** ☐	**Safe Work Agreement No:**	
Scope of Work		**Date:**	**Time:**
		Estimated Fall Distance:	**(metres)**

2. Working at Heights Hazards Identified from Pre-Job Hazard Assessment and Job Discussion:

Ongoing Hazard Review by: **Every** **Hour(s) & Initial:** 1st 2nd 3rd 4th

3. Fall Protection System Requirements: (All other PPE will be recorded on the Safe Work Agreement)

- ☐ Full Body Harness
- ☐ Safety Belt
- ☐ Lanyard
- ☐ Shock-Absorbing Lanyard
- ☐ Self-Retracting Lanyard
- ☐ Anchor Sling
- ☐ Permanent Anchor Point
- ☐ Temporary Anchor Point
- ☐ Power Lift
- ☐ Other:
- ☐ Vertical Lifeline
- ☐ Temporary Horizontal Lifeline
- ☐ Permanent Horizontal Lifeline
- ☐ Rescue Self-Retracting Lanyard

4. Controls and Safeguards:

- ☐ Discuss fall hazards and control measures
- ☐ Personal gas monitor required: ☐ Yes ☐ No
- ☐ Verify that workers are trained and certified
- ☐ Swing radius checked for hazards
- ☐ Lifeline installation inspected
- ☐ Other:

☐ **Minimum Clearance Distance =**

A = B = C = D = E = 1 meter

- ☐ All snap hooks and carabineers inspected
- ☐ Anchor point(s) and slings verified & inspected
- ☐ Buddy check full body harnesses and lanyards
- ☐ Safety Watch designated:

5. Procedures to Assemble, Maintain, Inspect, Use and Dissemble the Fall Protection System:

6. Emergency Response and Rescue Procedures (reviewed suspension trauma and procedures for a failure of the lifting system):

7.	Workers: Name	Init.	Company	Name	Init.	Company
8.	**Rescue Team: Name**	**Init.**	**Company**	**Name**	**Init.**	**Company**

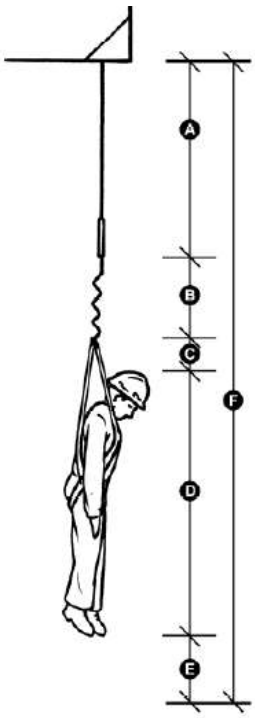
9. Sign-off: (This form has been prepared based on the requirements of Harvest's Working at Heights SWP.):

Fall Protection Plan Holder: _____ Signature

Fall Protection Plan Holder: _____ Signature

Distribution: White – Fall Protection Plan Holder / Yellow – Post at Work Site / Pink – Book Copy

Calculating Clearance Distances



Assumptions:
The worker is 1.8 m (6 ft.) tall using a 1.8 m (6 ft.) long lanyard. The combined weight of the worker, clothing, and tool belt is at least 100 kg (200 lbs).

A Length of lanyard – 1.8 m (6 ft.)

B 1.1 m (3.5 ft) due to shock absorber pulling apart

C Harness stretch plus D-ring sliding – 0.45 m (1.5 ft.)

D Height of worker – 1.8 m (6 ft)

E Safety factor – clearance below feet of 0.9 m (3 ft.)

F A+B+C+D+E
Overall minimum clearance is 6.0 m (20 ft.)

Regulatory Requirements

1. A personal fall arrest system must be arranged so a worker cannot hit the ground or an object or level below the work area.
2. The personal fall arrest system maximum arresting force on a worker to 6 kilonewtons or 8 kilonewtons if an E6 type of shock absorber is used as per manufacturer's instructions.
3. Maximum free fall is 2 metres or the limit specified in the manufacturer's instructions, whichever is less.
4. Limit the vertical distance of a fall by
   a) Selecting the shortest length lanyard that will still permit unimpeded performance of the worker's duties.
   b) Securing the lanyard to an anchor no lower than the worker's shoulder height.

Note: If a shoulder high anchor is not available, then secure the lanyard to an anchor that is located as high as is reasonably practicable above the worker's feet, but the above points 1, 2 and 3 must still be met.

SITE SPECIFIC ORIENTATION AND HAZARD ASSESSMENT

HOC Emergency #: 1-403-888-2540

Location:	**STARS Reg #:**	**SWA #:**

Scope of Work:

Imminent danger – No worker shall carry out any work, operate any tool, appliance or equipment if on reasonable and probable grounds, the worker believes that there exists an imminent danger to the health or safety of that worker or another worker on that site.

All workers in Canada have the obligation/right to refuse unsafe work, participate and know.

Hazards **Identify all Applicable Hazards for this Job/Task.** **Note:** *Hazards may include, but are not limited to the following:*	**Hazards Present (Check ✔)** **Yes**	**No**	**Initial Risk Ranking**	**Controls / Actions** **Identify and Develop Controls / Actions Required ensuring all Hazards are Effectively Managed.**	**Final Risk Ranking**	**Is Risk Effectively Managed? (Initial)**
e.g. access / egress	✔		**HIGH**	Designated evac routes, slope trench, install ladder, vehicle control	**LOW**	**DS**
Breaking piping integrity (purged, ventilation, depressured, etc)						
Environmental Conditions (hot/cold, wind, wildlife, etc)						
Chemicals (handling, PPE, SDS, labels, etc)						
Congested area / Concurrent work activities						
Confined Space / Restricted Space						
Electrical (high voltage, static, cords, grounding, LOTO etc)						
Equipment spacing (eg hot oiler, classified area, etc)						
Ergonomics (position, repetitive, lifting, overexertion, etc)						
Excavations/Trenching (access/egress, CSE, barricades, signs, etc)						
Fire / Explosion hazards (combustible materials, flame, etc)						
Hazardous atmosphere (benzene, NORM, H_2S, LEL, etc)						
Hazardous materials (Benzene, Asbestos, NORM's, etc)						
Hazardous wastes (handling, storage, disposal, etc)						
Hoses (whip checks, pressure rating, intended service, etc)						
Ignition sources (welding, elec tools, vehicles, grinding, heaters, etc)						
LEL / H_2S / Fire Eyes / Cathodic Protection bypassed						
Lifting (hand, cranes, hoists, equip condition, etc)						
Mobile Equipment (pre-checks, training, etc)						
Noise levels (greater than 85 dBA and/or 96 dBA)						
Overhead hazards (power lines, clearance, piping, etc)						
Pinch points (guards, spacing, pipe)						
Remote worksite (FA transportation, work alone, etc)						
Rotating equipment (guards, pinch points, etc)						
Sharp Edges (tin, pipe cutoffs, glass, banding, etc)						
Slips, Trips, Falls (oil, ice, mud, stairs, ruts, walkways, etc)						
Spills / Leaks (containment, controls, etc)						
Tools / Equipment (defective, explosion proof, etc)						
Underground hazards (pipe, power cables, phone, etc)						
Worker competency (inexperienced, new, certified, etc)						
Working at heights (fall protection/plan, ladders, scaffolds, etc)						
Other Hazards (not listed above)						

Have the applicable JSA, COP, SOP, Policies, Procedures been Reviewed? ☐ Yes ☐ No If no, Explain: _____

Do you fully understand:	**Identify Responses / Comments**
The emergency alarms and responses? (Muster Points, Wind Direction, Evac Route)	
Where closest safety equipment is? (Fire Ext, Eyewash Station, Safety Shower)	
Where the site facilities are? (Washrooms, Smoking Area, Drinking Water, Parking)	
Who's mentoring inexperienced workers? (Supervisor, Other Worker)	
Your roles & responsibilities? (Worker, Supervisor, Safety Watch, Fire Watch)	
The reporting structures? (Site Rep, Supervisor)	
Reporting requirements? (First Aid, Hazards/Near Misses, Incidents)	
Special PPE requirements? (goggles, respirator, SCBA, 4 gas monitor, gloves, chem suits, etc)	
The first aid / rescue plan? (Attendants, First Aid Station, Transportation, Communication)	
Signs posted? (to location, re moving equipment, overhead hazards, trenches)	

Review the Site Specific Orientation and Hazard Assessment whenever the job scope changes and/or a new worker arrive.

Site Diagram

Original copy must be turned into – Operating Authority

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Sign In / Out Sheet

I have participated in this Site Specific Orientation and Hazard Assessment process, and clearly understand my responsibilities, the hazards and controls addressed for this job.

Date	Company	Site Specific Orientation & Hazard Assessment #	Name - Please Print	Signature	Time In	Time Out

Date	Company	Site Specific Orientation & Hazard Assessment #	Name - Please Print	Signature	Time In	Time Out

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VISITOR ORIENTATION

Welcome to Harvest Operations Corp. Location:

THE NOTED RULES ARE INTENDED TO HELP KEEP YOU SAFE WHILE VISITING OUR LOCATION; THEREFORE YOU ARE EXPECTED TO ABIDE BY THEM!

Our location consists of_____. Please be aware that the atmosphere could be toxic, explosive or oxygen deficient. All visitors are required to carry a personal 4 gas monitor or the visitor escorted and under direct supervision, 100% of the time, by a Harvest representative.

Everyone on location may be required to wear a hard hat, safety glasses, CSA approved footwear and fire retardant clothing. Clothing worn under the outer garment must be made of natural fibres that will not melt when exposed to heat (synthetic clothing is not allowed). Some areas of the operation may require hearing protection to be worn, which are indicated on the building entrances.

Smoking is allowed only in designated areas.

Harvest staff must accompany visitors while at the facility. In the event of an emergency or if an unsafe condition develops, the muster point will be the office unless otherwise specified.

The alarm system consists of

_____.

Please take note of all exits and routes back to the muster point while on location.

All vehicles must be parked in accordance with the Harvest back-in or pull through rule.

Cell phones, cameras and other electronic devices are potential ignition sources and must be turned off or left in the office or your vehicle. No flash photography is allowed without the consent of the applicable Harvest staff.

Controls and equipment must not be touched unless authorized to do so by Harvest staff.

Please sign the attached attendance/acknowledgment sheet when you arrive and leave the location.

Thank you for your cooperation.

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Harvest
OPERATIONS CORP.

Visitor Attendance/Acknowledgment Sheet

Location:

Date	Company	Name - Please Print	Signature	Time In	Time Out

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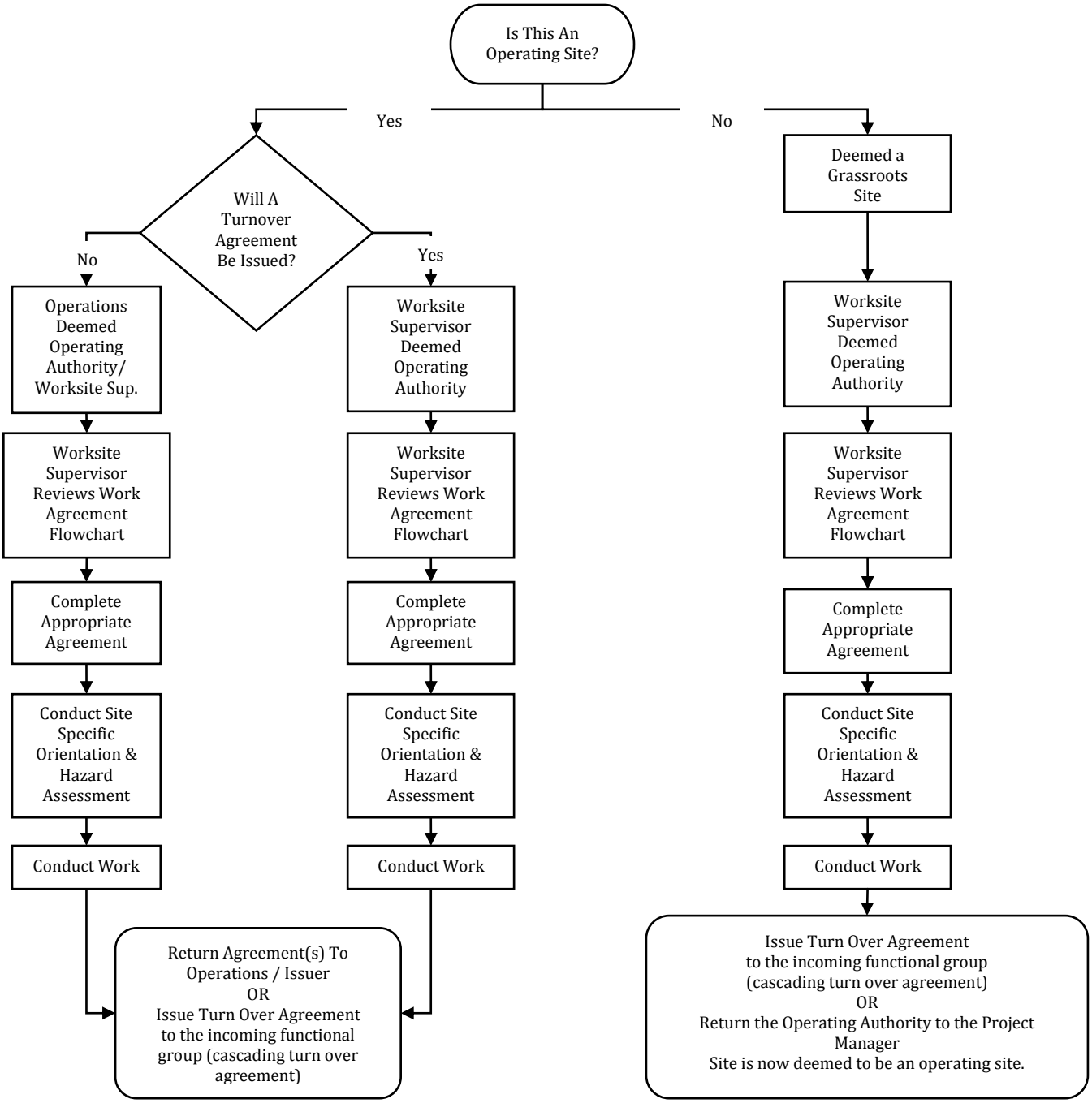
Process To Determine Operating Authority (Worksite Responsibilities)



10 Key Principles

1. Identify the Harvest Operating Authority
2. Acquire authority to proceed with work
3. Identify and document names of Worksite Supervisor and alternate
4. Identify scope of work, list tasks (stop work if scope changes
5. Assess competency for the tasks at hand
6. Identify hazards (including those related to concurrent work) and assess risk
7. Identify risk controls and assign any required actions
8. Ensure compliance with regulations
9. Plan Site Emergency Response (contacts, muster areas etc.)
10. Review with all workers and document

Definitions:

- Operating Site - Operating facility on site (well, satellite, SWB, tied into another facility, etc). Once a site has attained "Operating" status it cannot revert to grassroots.

  NOTE: a site that is in the reclamation stage the operating authority will be permanently assigned to the Environment

Grassroots - New lease, no operational facility on site, has not been turned over to operations yet

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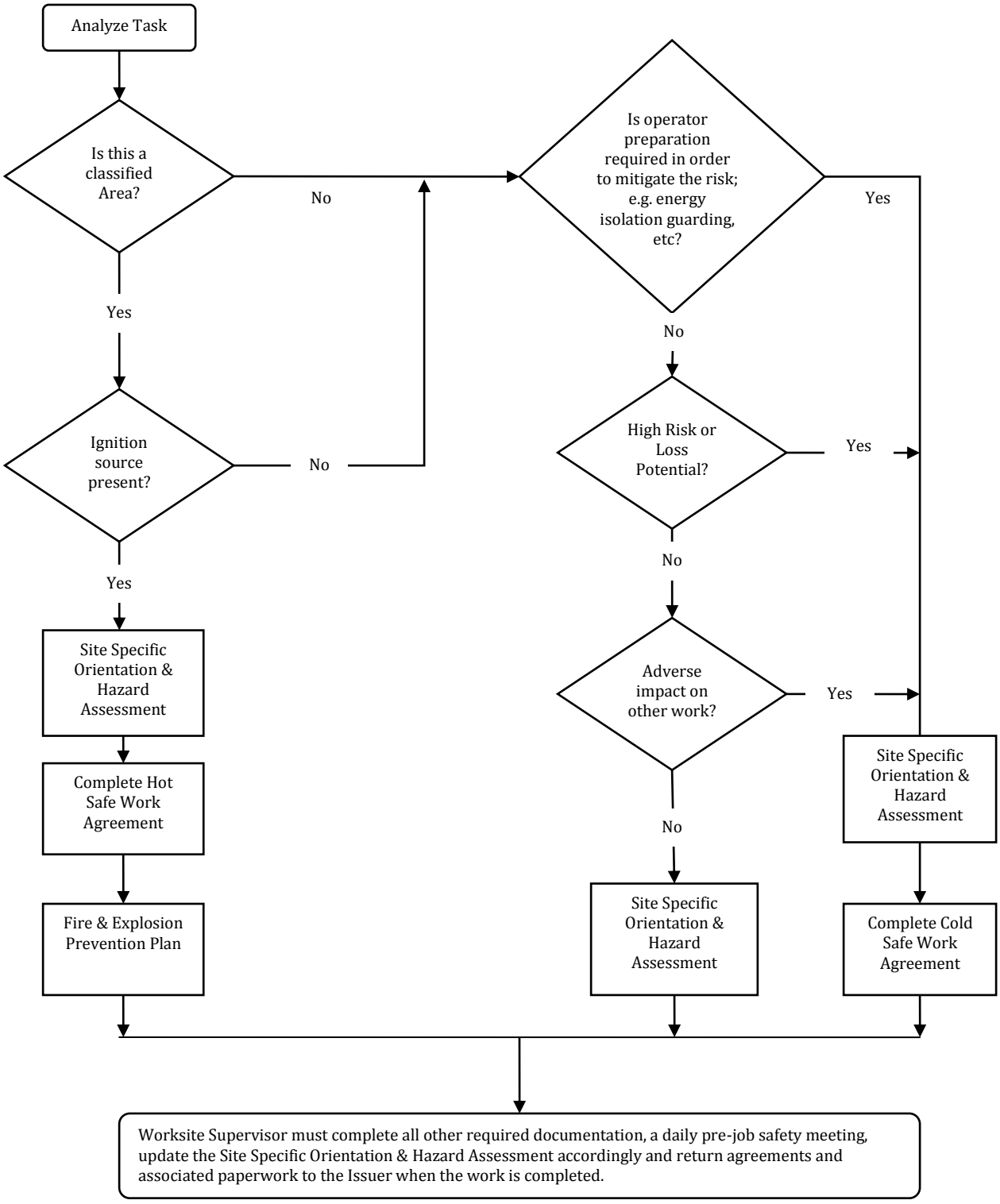
Safe Work Agreement Flowchart



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Safe Work Agreement

Harvest Operations Corp. **HOC Emergency #: 1-403-888-2540**

Date:	**Location:**	
Harvest Representative (Issuer):	**Cell #:**	
Harvest Representative Alt:	**Cell #:**	
Worksite Supervisor:	**Cell #:**	**Company:**
Worksite Supervisor Alt:	**Cell #:**	**Company:**
Receiver:	**Cell #:**	**Company:**

Scope of Work:

Assigned Initial Risk Ranking:
*Refer to Site Specific Orientation & Hazard Assessment Form

☐ Cold Work	☐ Hot Work ☐ Fire & Explosion Prevention Plan (required if hot work) - Reference #	☐ Turnover

Worksite Supervisor must:

☒ Conduct a Daily Pre-Job Meeting	☐ Manage Concurrent Work Hazards	☒ Location Specific ERP
☒ Conduct a Daily Hazard Assessment	☒ Conduct Site Specific Orientations	☐ Other
☒ Assess Worker Competency	☐ Return Agreement to Issuer	
☒ Stop Work if Scope Changes	☐ Call Issuer When Completed	
☐ Issue Additional Safe Work Agreements	☐ Working Alone Policy	

Supporting Documentation including but not limited to:

Permit / Form	Reference #	Documents
☐ Confined Space Entry		☐ Site Specific - Fall Protection Plan
☐ Ground Disturbance Checklist		☐ Working in Proximity to Overhead Power-lines
☐ JSA, COP, SOP, Policies, Procedures		☐ Lockout - Tagout (LOTO)
☐ Critical Lift Plan		☐ Forest Fire Assessment Plan
☐ Site Specific Orientation & Hazard Assessment		☐ Other:

Site Conditions / Other Considerations:

☐ Sour _____ PPM or _____ % ☐ Overhead Power Lines ☐ Isolated / Zero Energy Wind Direction Specify: _____

Assigned Final Risk Ranking:
*Refer to Site Specific Orientation & Hazard Assessment Form

Tailgate / Pre-job Meeting Sign Off: (use additional signature sheet if needed)
I have participated in this Site Pre-Job Meeting and clearly understand and agree with my responsibilities, the hazards and controls addressed for this job.

Name (print):	**Signature**	**Name (print):**	**Signature**

Approval:

Issuer Signature:		**Receiver Signature:**			
Date / Time of Issue:		Extension 1:		Initials:	
Date / Time of Expiry:		Extension 2:		Initials:	

☐ **This agreement was communicated via telephone. Issuer's / Receiver's Agreement #** _____

Hand Back / Job Completion Conditions:

☐ Conducted Site Specific Orientation and Hazard Assessment ☐ Job Safety Analysis (JSA) ☐ Attached Documents

Issuer: _____ Signature / Date **Receiver:** _____ Signature / Date

White / Yellow – Receiver Pink - Issuer

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Working in Proximity to Overhead Power Lines

Location _____ Contact Person _____
Power Line Operator _____ Phone _____
Power Line Voltage _____
Safe Approach Distance _____ (as stated by power line operator)

EQUIPMENT REVIEW		
Equipment	**Normal Height (m)**	**Maximum Extended Reach (m)**

APPROACH DISTANCES Complete questions 1) and 2) below

1. Will EQUIPMENT be operated within 30m of the power line (measure horizontally along the ground)?

Yes No

If yes, is the power line de-energized?

Yes No

If, no, a written procedure to conduct work safety must be written below and agreed upon by the Site Supervisor and Harvest's next level of supervision (foreman, superintendent, project manager):

AND

2. Does your work require that WORKERS or EQUIPMENT approach within 7m of the overhead power line (measure horizontally along the ground)?

Yes No

If yes, contact the power line operator for assistance to determine safe approach distance to:

a) ensure their requirements are met, **and:**
b) arrange for the power line to be de-energized prior to work, **or:**

Provide a written procedure for safe approach below to be agreed upon by the Site Supervisor and Harvest's next level of supervision (foreman, superintendent or project manager).

SIGNAGE REQUIREMENTS

	Complete (yes or n/a)
Place highly visible warning signs 30m from and parallel to the power line on the work side of the power line (both sides if the work area transects the power line).	
Place highly visible warning signs directly beneath the power line if it transects the work site or crosses an access road to the worksite.	

Worksite supervisor	**Next level Supervisor**	**Operating Authority if not already covered**
(print)		
(sign)		
Issued Date:	Time:	

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