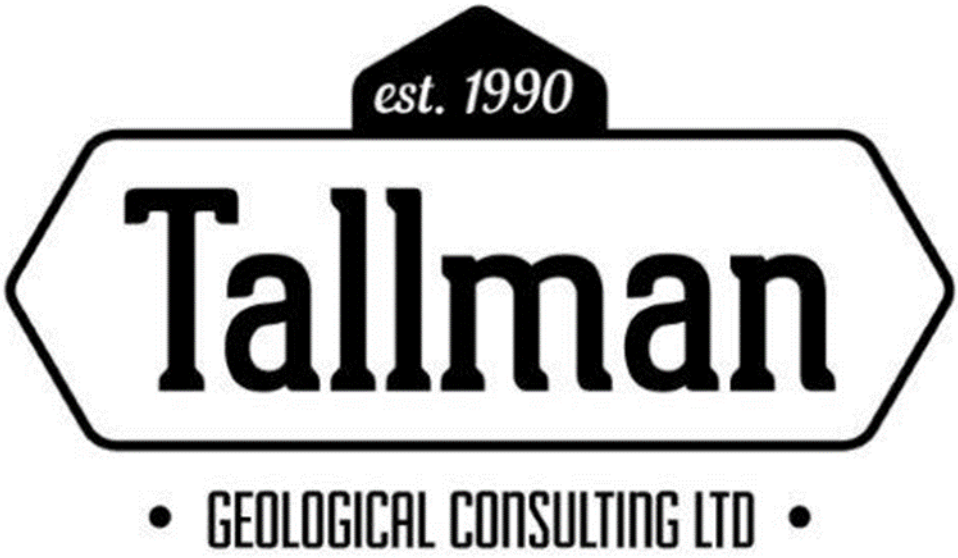


CORPORATE HEALTH AND SAFETY MANUAL

JULY 1, 2020

SAFETY STATEMENT

Tallman Geological is passionate about creating positive interactions with the companies we provide service for. As such, we take pride in conducting our Safety business in a way that minimizes environmental impacts, maximizes safety and ensures ethical business practices are always upheld.

Tallman Geological will provide adequate control of the health and safety risks arising from our work activities on all work sites and collaborate with our employees and other contractors on matters affecting their health and safety while on site.

Tallman Geological will provide and maintain their equipment in a manner that minimizes any risk to the end user of their products and services. We will also ensure the safe use and handling of any substance issued by us.

Tallman Geological will provide information and instruction for their employees and provide adequate training to ensure they are competent to do their tasks.

Tallman Geological will maintain safe and healthy working conditions to prevent accidents and cases of work-related ill health.

Tallman Geological will review and revise this policy as necessary at regular intervals.

July 1st, 2020

Jared McLeod (Partner) Date

TALLMAN GEOLOGICAL/ENVIRONMENTAL PROTECTION POLICY

We will conduct business in a manner that conserves resources and strives to reduce our environmental footprint. We seek continual improvement in our environmental performance by setting, reviewing and updating environmental goals.

Tallman Geological management commitment to environmental protection is incorporated into its values and business activities through the following principles:

- Managing operations to comply with all applicable laws and regulations and industry
- standards, emphasizing emission reduction and environmental impacts. Tallman Geological will, in the absence of legislation, apply cost-effective best management practices to promote environmental protection.
- Project planning for drilling, construction, and decommissioning that includes identifying, evaluating and mitigating the environmental impacts to the air, water and soil.
- Effective response to emergencies to protect the public, our workers and the environment.
- Education and training to support a culture that seeks to protect the environment.
- Awareness, leadership and accountability with respect to environmental protection among all our employees and contractors.
- Taking measures to ensure efficient use of materials, resources and energy to reduce and manage waste.

Our employees share in this responsibility and are accountable for the successful implementation of this policy and are empowered to curtail operations, as necessary, to prevent serious environmental impacts.

July 1st, 2020

_____ _____

Jared McLeod (Partner) Date

TALLMAN GEOLOGICAL CORPORATE HEALTH AND SAFETY POLICY

At the core of Tallman Geological business practices, and I keeping with our values, is a high standard for health and safety – for the protection of our employees, contractors, public and the environment. Tallman Geological will require all personnel to meet these standards.

Tallman Geological obligates itself, our employees, and agents to conduct our business in such a manner as to prevent incidents and mitigate impacts to personnel, public or the environment stemming from its business practices.

Tallman Geological will commit the resources required to protect and promote the health and safety of its employees, contractors, and members of the public. We will conduct our operations in accordance with all relevant regulations and legislation.

Recognizing that the responsibilities for health, safety and loss prevention are shared, the following principles and responsibilities related to health and safety shall guide all employees and contractors working for Tallman Geological:

- Management shall ensure that health and safety policies, procedures and programs will be implemented to meet or exceed industry standards and legislative requirements. The leadership team at all levels, will support and apply these requirements and take an active role in program improvement. Performance measures and targets are established for our key program areas and the performance relative to targets will be reported to management on a routine basis.
- Management will ensure compliance through audits and will participate in field tours, inspections, and group safety meetings.
- Management will ensure that employees, contractors, and service providers are adequately trained and competent to perform their jobs in a safe manner.
- Supervisors, at all levels, are responsible to continuously promote, reinforce, and monitor worker's compliance to the Health and Safety program requirements.
- Compliance with safety policies and procedures and applicable regulations is the responsibility of all employees, contractors, and service providers, and is a condition of employment.
- We will develop and maintain effective site-specific emergency response capability, ensuring personnel are adequately trained to effectively respond to emergencies.
- All hazards, near misses and accidents shall be immediately reported and appropriately investigated.

Tallman Geological managers, supervisors, employees, contractors, and subcontractors are responsible to identify, assess and control hazards affecting people, environment, or property.

A joint and continuous effort by Management, Supervisors, Employees and Contractors will ensure the shared benefits of a safe and healthy workplace and a successful company.

July 1st, 2020

Jared McLeod (Partner) Date

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose of Manual

TALLMAN GEOLOGICAL, has developed and implemented a comprehensive Health and Safety Management System to provide employees and contracted personnel with a safe and healthy environment in which to carry out their work.

TALLMAN GEOLOGICAL is committed to a comprehensive and effective Health and Safety Management System that meets or exceeds regulatory requirements to protect all employees, contract operators and contractors from personal injury and health hazards.

The Corporate Health & Safety Policy, Environmental Protection Policy along with the Tallman Geological Safety Statement, included at the front of this manual, reflect the values and principles held by the company with respect to health and safety of workers.

It is the responsibility of all employees, contract operators and management to become familiar with the contents of this manual and to use the principles, policies and procedures to protect the health and safety of themselves and all workers, whether they are employees of Tallman Geological or not.

All personnel are required to be aware of, and abide by, the government regulations that apply in the area they are operating. If there is any situation where there is a conflict between company policy and government regulations, the legislated requirements shall apply.

Anyone who is uncertain or does not understand the policies or procedures described in this manual is expected to discuss the issue with their management.

2.0 LEADERSHIP AND RESPONSIBILITIES

2.1 Purpose

For a health and safety management system to be effective, management must show leadership and commitment to the program. Tallman Geological is committed to establishing and maintaining an effective and responsive health and safety management system that meets or exceeds all regulatory and industry standards.

The first step in developing a health and safety system is to put the company's health and safety policy and expectations into writing.

Tallman Geological Health and Safety Policy contains:

- A written declaration of the company's commitment to health and safety.
- Overall goals and objectives of the company's health and safety program.
- A copy is included at the front of this health and safety manual along with other important documents.

Management demonstrates its leadership and commitment to the health and safety program by their actions as well as through their words. Accountability for health and safety is an important and integral component of Tallman Geological

Accountability for health and safety is built into the job responsibilities for all levels of management, supervisors, contractors and worker. Specific safety responsibilities are detailed in the following section.

2.2 Responsibilities

Assigning safety responsibilities is an important component of translating a safety program from philosophy to functionality. Safety responsibilities establish specifically who does what and when for activities identified in the safety program. Responsibilities must be quantifiable in the safety program so that performance can be measured or evaluated. Managers cannot control what they cannot measure. To meet the intent of this element, the task or responsibility must be clearly stated, the position responsible for performing the task must be identified and the frequency of the task performed must be included. Ensure that responsibilities are identified for every position that may have an impact on safety within the company. This should include managers, supervisors, employees, contractors and visitors.

2.2.1 Employer

Tallman Geological, as an employer, shall:

- Do everything reasonably practical to protect the health and safety of all persons working onsite with Tallman Geological
- Make its workers aware of their responsibilities under the Occupational Health and Safety Act, Codes and Regulations and Tallman Geological safety requirements.
- The employer must ensure that a current paper or electronic copy of the Provincial Occupational Health and Safety Act, Codes and Regulations are readily available for reference by workers.
- Inform workers of their right and responsibility to refuse to carry out any work or operate any equipment, tool or appliance if doing so would put that worker or any other worker in imminent danger.
- Make all persons on the worksite reasonably aware of hazards and changing conditions that may have an impact on their safety.

2.2.2 Management

Management has some specific responsibilities for implementing the health and safety program:

- Promote and monitor Tallman Geological H&S programs and tools.
- Inform site representatives of established safe practices and standards of design for the protection of the personnel and equipment.
- Work constantly to improve procedures, designs and equipment and implement all practical safety recommendations.
- Review and/or participate in incident investigations and take corrective measures to prevent similar occurrences.
- Stay informed of changes in equipment and procedural use of equipment.
- Stay informed of changes in government regulations and industry standards.
- Demonstrate by example that incident prevention is an essential part of the work.
- Know and exercise the standards established in the safety manual.
- Ensure that safety inspections are completed on worksites.
- Allocate necessary resources in support of safety management.
- Ensure ERPs are available, regular drills are conducted and all rescue and first aid equipment are in place and in good condition.
- Comply with all regulatory agency record keeping and reporting requirements.
- Audit the effectiveness of the safety program and make improvements when opportunities arise.

2.2.3 Workers and Contract Employees

Working safely is an integral part of the job for all workers. Tallman Geological considers workers and contract employees to be equal in all areas of safety responsibility. Cooperation with fellow

workers, the employer and the prime contractor is essential. Follow all safety rules, avoid taking unnecessary risks, use all safeguards and safety equipment and make safety a part of the job.

- Promptly report all hazards. Necessary steps shall be taken to immediately reduce or eliminate the hazard. If the hazard cannot be eliminated immediately, they shall take steps to control the hazard.
- Follow safe work procedures and take an active part in the work of protecting themselves, their fellow workers, and the equipment.
- Promptly report any incident that results in injury, property or equipment damage, product loss, damage to the environment or any near miss incident that could have resulted in the above. This is not to assign blame, but to allow for a thorough investigation and a learning tool which may prevent a similar incident from occurring in the future.
- **Right to Refuse Unsafe Work**. Workers have the right to refuse to operate any tool, equipment or machinery or do any job that they suspect will put that worker or any other worker in imminent danger. An imminent danger is a danger that is not normal for the employee's occupation or a danger under which the worker would not normally carry out his work. Work must stop. If a worker refuses to do a job, the worker shall immediately contact the supervisor and explain the reason for refusal. Supervisor will investigate. If the investigation reveals that no hazard exists, then worker may escalate issue to management. With no resolution, matter can be referred to OH&S.
- Harassment and workplace violence directed towards another worker will not be tolerated. Violation will lead to disciplinary action.
- Maintain good housekeeping. The orderly condition of the jobsite reflects the worker's interest and conditions.
- Call for assistance when needed. Do not attempt non-routine hazardous work alone.
- Be alert. Pay attention. Know your job. Perform it properly. Work at a safe speed.
- Encourage co-workers to read safety publications.
- Observe and apply principles of safety and incident prevention on and off the job.

2.3 Standards

The following standards are to be followed when implementing this section of the Tallman Geological Health and Safety Management System.

OH&S Legislation: Saskatchewan OH&S Act - Part 2 – Division 3 Duties

2.4 Implementation

- All applicable employees, consultants, and contract operators working for Tallman Geological, will receive and acknowledge their responsibilities for reviewing and understanding this manual.
- Management, supervisors and site supervisors will ensure that workers and contractors under their supervision are aware of their responsibilities as defined under Tallman

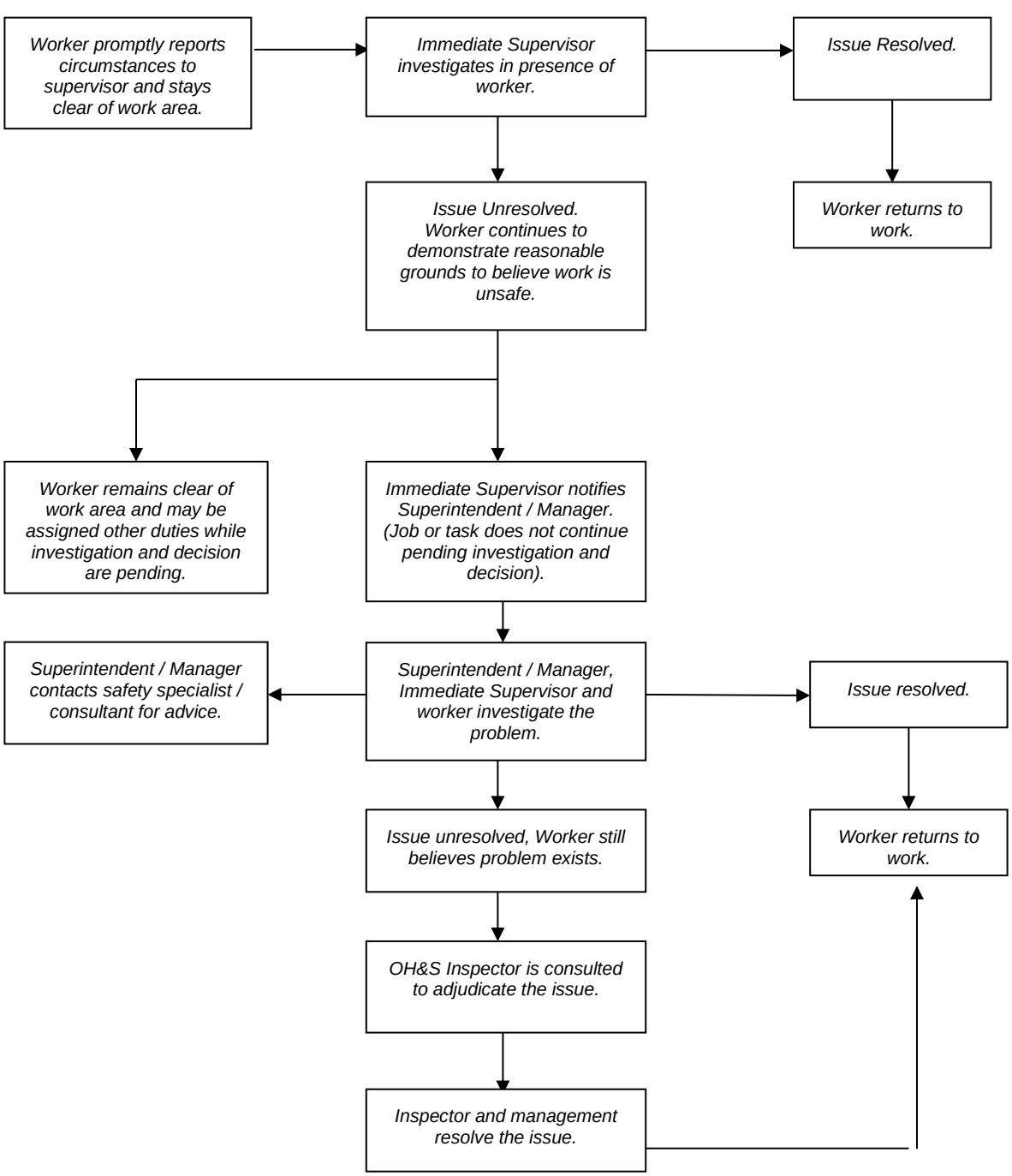
Geological Health and Safety Management System, the OH&S Act, Codes and Regulations.

- Responsibilities for worker safety will be addressed and documented at pre-job meetings and general safety meetings.

2.5 Review/Follow Up

- Tallman Geological standards and requirements for leadership and responsibilities will be reviewed as a part of the regular review of the Health and Safety Management System.
- Tallman Geological standards and requirements for Leadership and Responsibilities will be reviewed whenever the applicable OH&S Legislation is updated or changed.
- The Leadership and Responsibilities section of the Tallman Geological Health and Safety Management System will be reviewed annually as part of the internal audit protocol.

2.7 Refusal to Work Flowchart



This page has been left blank intentionally.

3.0 HAZARD IDENTIFICATION AND CONTROL

3.1 Purpose

In order to reduce the risk of incidents where Tallman Geological works, it is necessary to better understand the hazards that workers are exposed to on a regular basis by learning the connection between a “hazard” and their potential “risk” factor.

Hazards: A source of danger with the potential for loss, injury or illness to person or damage to a process or equipment. For example, hydrogen sulfide is a hazard, moving equipment is a hazard and sulphuric acid is a hazard. Each of these agents can cause harm or injury to a worker who is exposed to the agent without protection. The severity of the potential consequence when a person, process or equipment is exposed to a hazard is one factor in determining the risk that the hazard presents.

Risk: The chance of a loss occurring; the calculated potential for harm from exposure to a hazard. Risk = Severity x Likelihood. When determining risk, it is necessary to first estimate the potential consequence from exposure to the hazard and then calculate the likelihood of the exposure occurring.

If an existing or potential hazard to the workers, the public, equipment, facilities or the environment has been identified, Tallman Geological will do all that is required to minimize the risk by:

- Eliminating the hazard; or
- If elimination is not reasonably practicable, control the hazard or substitute with a lower risk alternative.

3.2 Responsibilities

Site supervisors are accountable for assessing the worksite and identifying any existing or potential hazards before work begins at the site.

3.2.1 Field Management / Foremen / Site Supervisors

Tallman Geological is responsible for ensuring that a hazard assessment is completed and that steps are taken to reduce the risk of the hazard. This assessment must be dated and made available to workers who may be exposed to the hazard(s).

The hazard assessment must be repeated:

- when a new work process or piece of equipment is introduced.
- when the work process or operation changes; or
- at regular intervals to prevent the development of unsafe and/or unhealthy working conditions.

Site supervisors are responsible for making sure workers are aware of all hazards and that steps are taken to reduce the risk to a level that is reasonable and practicable for the work being done.

3.2.2 Workers and Contractors

Workers and contractors are responsible for following procedures and using equipment, including personal protective equipment, to eliminate or reduce the risk from known or potential hazards.

3.3 Standards

OH&S Legislation: Saskatchewan OH&S Regs - General Duties

3.4 Implementation

3.4.1 Hazard Identification

The first step in eliminating or controlling hazards is to recognize that they exist. This process will involve experienced employees taking time to systematically evaluate the work processes that they are familiar with. Hazard identification will be a regular part of the site inspection process. Hazards recognized on these tours must be clearly documented and prioritized according to risk level.

Some hazards are more obvious than others. For example, overhanging pipes in a dimly lit walkway, emergency exits blocked by materials and slippery drilling floors are hazards that are clearly visible to all. Assessment and management of the risks associated with these hazards can usually be made and remedied immediately. It is unlikely that there will be any disagreement and the solutions are often simple (i.e. better lighting, signs, symbols, color coding, training, etc.).

Other hazards are not so easily recognized (i.e. the combination of some chemicals or the toxicity of products). Technical and other expertise is often required to identify the hazard and properly determine these risks. For example, technical information must be considered when dealing with issues such as chemical toxicity, airborne contamination, environmental damage, routes of entry, etc.

3.4.2 Risk Assessment

After the hazard has been identified, the risk must be evaluated to determine whether it is acceptable. Group discussion and safety meetings help in this determination.

Risk assessment is a tool for analyzing the probability of failure of a procedure, equipment or facility failure and for calculating the impact of the failure on the personnel, the public, the facility or the environment.

A failure which has a high probability of occurrence and which has severe consequences for the people, equipment or the environment must be prevented, even at high cost. The cost of a failure is much higher in terms of damage and cost to the company. A failure which has a low probability of occurrence or minor impact to the environment constitutes a lower risk. However, preventative measures should still be implemented.

Procedure for Risk Assessment

There are three steps that must be taken to determine the risk. These are explained in the chart that follows.

Step 1: Identify the Severity

The potential consequence of exposure to an uncontrolled hazard is defined in estimation of impact to the people, environment, assets, and reputation of the company. Specific definitions for each level of minor, moderation, major and serious are established for Tallman Geological in the following table.

Step 2: Determine the Estimation of Probability

The probability of occurrence is estimated in a range from remote, unlikely, likely and frequent.

Step 3: Categorize the Risk

The risk is then categorized in terms of low, medium, high and extreme risk. Low risk is deemed to be acceptable while medium requires mitigation and high and extreme are undesirable or unacceptable with corrective action required.

Once the risk factors have been determined for all the company operations they can be prioritized, and action taken in order of priority. High and extreme risk hazards should be flagged for immediate corrective action to ensure workers are aware of the hazard and the risk involved and to take steps as soon as possible to eliminate or reduce the risk. Until corrective measures have been implemented, work should not proceed. However, temporary measures can be implemented in the interim to protect workers, equipment and facilities that may be impacted by an uncontrolled exposure to the hazard.

RISK MATRIX

High: Requires Action **Moderate:** Action or further study **Low:** Investigation as resources permit

SEVERITY	LIKELIHOOD			
	FREQUENT Expected to occur routinely or repeatedly over the life of the facility. Weekly or monthly: probability – 0.1	**PROBABLE** Commonly known to occur but not routine. Likely to happen at several times in the life of the facility. Yearly or longer: probability – 0.01	**OCCASIONAL** Likely to occur sometime in the facility life. Not normally expected unless precautionary measures fall. Once every 10 years: probability – 0.0001	**REMOTE (Unlikely)** Has happened somewhere and could conceivably occur at this facility but is very unlikely. Probability – 0.000001 to 0.001
MAJOR (Catastrophic) Personnel: Permanently disabling injury or fatality Public: Exposed to life threatening accident Environment: Large uncontained product / chemical release into water Equipment: Damage which results in downtime of 10 days +	*1* **EXTREME RISK** **STOP:** Evaluate thoroughly. Take steps to reduce risks before restarting	*2* **HIGH RISK** Evaluate thoroughly. Take all necessary steps to reduce risks.	*3* **MEDIUM RISK** Evaluate. Take appropriate steps to reduce risks.	*4* **LOW RISK** Evaluate. Consider alternatives for reducing risks.
SERIOUS Personnel: Lost time injury with partial or no disability Public: Exposed to potential injury accident Environment: Large uncontained product/chemical release Equipment: Damage which results in downtime of 1-10 days	2 **HIGH RISK** Evaluate thoroughly. Take all necessary steps to reduce risks.	3 **MEDIUM RISK** Evaluate. Take appropriate steps to reduce risks.	4 **LOW RISK** Evaluate. Consider alternatives for reducing risks.	5 **MINIMAL RISK** Review and evaluate need for reducing potential risks.
MINOR (Important / Noticeable) Personnel: Injury requiring medical / first aid with no lost time Public: No impact Environment: Product/chemical release contained on lease Equipment: Damage which results in downtime less than 1 day	3 **MEDIUM RISK** Evaluate. Take appropriate steps to reduce risks.	4 **LOW RISK** Evaluate. Consider alternatives for reducing risks.	5 **MINIMAL RISK** Review and evaluate need for reducing potential risks.	6 **NEGLIGIBLE RISK** Review to confirm potential risks.
NEGLIGIBLE Personnel: Injury requiring minimal or no first aid Public: No impact Environment: Product/chemical release contained in process Equipment: Negligible downtime of less than 6 hours	4 **LOW RISK** Evaluate. Consider alternatives for reducing risks.	5 **MINIMAL RISK** Review and evaluate need for reducing potential risks.	6 **NEGLIGIBLE RISK** Review to confirm potential risks.	7 **NO RISK** No review required

3.4.3 Hazard Assessment

A hazard assessment is the systematic examination of a job intended to identify potential hazards, assess the degree of risk and evaluate practical measures to control the risk.

Hazard assessments are not a workplace inspection or an audit procedure. It is a systematic examination of workplace conditions and practices to determine if they meet provincial OH&S standards and company policies and procedures. The hazard assessment will also assess whether there is room for improvement in making the work practices under consideration as safe as possible for the workers involved.

Experienced workers, safety committee members and supervisors perform a hazard assessment by analyzing jobs through discussion and observation. This process ensures that people who are most involved in the work are included in the assessment and promotes "buy-in" of those who will be most affected by the recommendations.

The outcomes of the hazard assessment are prepared in a written report that is provided to the participants and reviewed by all involved prior to being accepted as a practice or procedure.

Procedure for Hazard Assessment

Step 1: Select the job to be analyzed: Prioritize jobs according to perceived levels of risk.

Select the highest risk jobs to be analyzed first, based on statistical analysis of incidents, absenteeism, exposure to harmful chemicals, potential for severe injuries or illness, new work processes, infrequently performed jobs, working alone, working in isolated places, and potential for violence in the workplace.

Lower risk jobs should be reviewed to ensure workers are aware of any potential hazards and are trained in dealing with those hazards.

Step 2: Break the job down into a series of tasks: A task is a segment of an overall job (i.e. starting the vehicle is a task in the job of driving).

Completion of each task in its proper sequence leads to the completion of the job. Completing the tasks in correct sequence is an important part of a hazard assessment as any task placed out of sequence may cause potential hazards to be missed or may introduce hazards that do not normally exist.

When conducting a hazard assessment, each task is recorded in its proper sequence and notes are made on what is to be done, with each step beginning with an action verb (i.e. Job – Changing a tire. Tasks – Park vehicle, get spare tire and tool kit, pry off hub cap, loosen lug bolts, jack up car, etc.).

Step 3: Identify potential hazards associated with each task: For each task, identify the hazards and potential hazards that could harm the worker involved.

Consider “What if” scenarios for each task to determine if a change in conditions, such as weather, equipment, experience, environment, etc., could present a new hazard (i.e. changing a tire on a busy highway shoulder presents different hazards than changing a tire in your garage).

Step 4: Determine measures to control the hazards

When all hazards and potential hazards have been identified, the next step is to determine ways of reducing the risk presented to workers by eliminating the hazard or mitigating the risk level.

Hazard control strategies include:

- Eliminate the hazard.
- Substitute with less hazardous tasks or materials.
- Isolate the hazard from the worker & isolate the worker from the hazard.
- Implement administrative controls such as limiting the time a worker is exposed to the hazard.
- Implement safe work procedures; and
- Provide the worker with personal protective equipment. Note that personal protective equipment should be the last resort and only used until a permanent solution to the hazard can be developed.

Step 5: Communicate the information to others

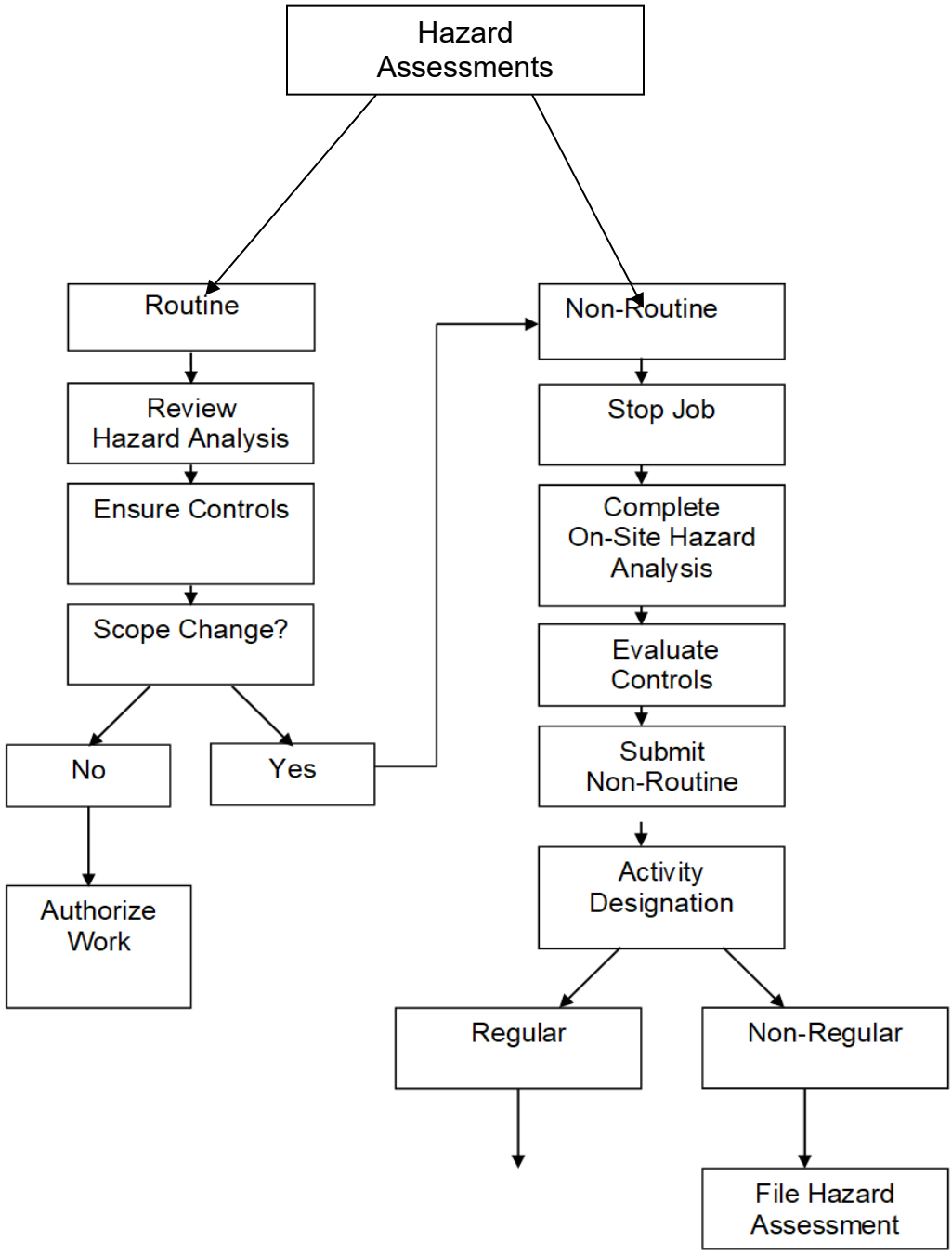
Once the measures to control the hazard have been developed, the results must be recorded and communicated to all employees who are involved in the job.
Usually the results of the hazard assessment are converted into a safe work procedure format.

A risk assessment can also be carried out to identify the risk level for each job. (Refer to Risk Assessment section for more details).

This will result in a step-by-step procedure that provides workers with information on how to carry out the tasks involved in the job, the sequence for carrying out the tasks, the hazards identified for each task and the hazard control measures to be implemented for each task. The equipment required for the job and the personal protective equipment required to ensure the worker is protected should all be listed for each step.

A record of all Safe Work Procedures must be kept and made available to all workers.
The hazard assessment process will be reviewed and updated as a part of the overall review of the Health and Safety Management System, whenever the applicable OH&S Legislation is updated, in the event of a serious incident, when there are any changes to the work being done and if new equipment or materials are acquired.

3.4.4 Hazard Assessment Process Chart



3.5 Hazard Controls

There are various ways by which the company manages or controls risk:

3.5.1 Elimination of the Hazard

Ideally, all risks should be eliminated, however experience shows that this does not always happen. As an example, individuals who perform the same task may, because of training and experience, different procedures and work habits, be exposed to different risks.

Removing harmful substances and discontinuing unsafe processes and activities can eliminate some risks. This approach must be accompanied by accurate record keeping and employee training.

3.5.2 Substitution of Process or Substance

If risks cannot be eliminated, substituting safer substances, processes and activities is the next option. Costs may be higher when this form of risk management is used however the costs for injury and lost time claims and damage must also be factored in if a cost analysis is the key factor.

3.5.3 Engineering and Design Changes

Engineering or design controls can be implemented to deal with risks. With this option, the cost increases considerably. It can be expensive to redesign or retrofit a facility or piece of equipment, but the benefits are safer work conditions and healthy, productive employees.

There are three common techniques of engineering controls:

- **Isolation** completely separates the employee from the area of risk. For example, a computer from a distant location can monitor a remote gas well, without the worker being close to the hazards.
- **Enclosure** indicates the area of risk is in the same area as the worker but enclosed in another room or structure to limit the exposure. For example, the furnace in a building may be in another room in the same facility.
- **Containment** applies to the storage and handling of a hazardous material. For example, in a chemical process the product could be contained in its original vessel, instead of being transferred to a storage vat. This would eliminate one of the steps, or exposures, where workers could be impacted by the hazard.

Safeguards

All moving belts, drive chains, reciprocating parts, and pinch points shall be guarded. Any unguarded machinery is considered a hazard and must be reported immediately to the supervisor.

3.5.4 Administrative Controls

Administrative controls limit access or exposure altogether, or as necessary. Using this method of management, workers do not work around or near risks unless a specific task requires it.

Exposure is limited by the amount of time the worker is in contact with the hazard and the worker is trained to follow specific safety procedures. In this case, signage, warnings, specific safe work procedures and the use of PPE will be required.

For example, personnel are only permitted to work in high-noise areas if it is essential, they limit the amount of time they are in the high noise area and must wear hearing protection to limit their exposure.

3.5.5 Personal Protective Equipment (PPE)

Personal protective equipment helps reduce the consequences of worker exposure to various worksite hazards. This equipment must be worn by workers where a danger of personal injury exists.

PPE must be worn if exposure to a risk is necessary and the exposure is above the safe levels as regulated by OH&S Legislation. Additional PPE may be required as determined by a hazard assessment. Refer to the provincial OH&S Code for further information regarding acceptable levels of contaminants and related regulations.

- Personal protective equipment should only be used as a temporary solution until an effective long-term solution can be found.
- Tallman Geological supplies necessary personal protective equipment for its employees and trains them how to wear, fit, clean, and store this equipment.
- Contractors and sub-contractors are responsible for providing and maintaining personal protective equipment for their employees.
- Supervisors are responsible for ensuring employees and contractors are aware of and use appropriate PPE for each job. All PPE must be inspected before use.

3.5.5.1 Head Protection

Workers are required to wear CSA approved hard hat protection on all Tallman Geological worksites.

- Meet provincial OH&S requirements for protection from overhead hazards and impacts.
- Hard hat liners must be of a fire-retardant material.
- Hard hats should remain free of materials that prevent close examination of the exterior shell for integrity.
- Hard hats should be replaced after five years of service, after an impact, or when the harness suspension is worn or frayed.
- When operating an all-terrain vehicle (ATV) or a snowmobile as defined in the Off-Highway Vehicle Act, workers shall wear protective headwear that is CSA approved.

Tallman Geological will provide the necessary head protection for its employees. Contractors and sub-contractors must ensure the necessary head protection for their respective employees is worn.

3.5.5.2 Eye Protection

Workers are required to wear CSA approved eye protection on all work sites. All personnel will follow safe work practices such as:

- Wearing safety glasses with side shields (fixed or detachable). This does not include vehicle cabs or offices.
- Wearing chemical-type goggles when handling any chemical.
- Wearing dust-type goggles and/or plastic face-shields when grinding, drilling, chipping, or any other operation where particles or materials may fly or blow into the eyes.
- Wearing specially tinted-type goggles or welders' helmet to protect against harmful light rays caused by welding or cutting.
- Wearing face shields to protect against flying particles, chemical splashes, flash back, pressure, etc. They can be worn over other glasses or goggles for added eye protection.

Tallman Geological will provide the necessary eye protection for its employees. Contractors and sub-contractors must ensure the necessary eye protection for their respective employees is worn.

3.5.5.3 Respiratory Protection

Where toxic and oxygen deficient environments that may affect the health of a worker are present (reference provincial OH&S regulations and Respiratory Protective Equipment in Appendix B for permissible chemical exposure levels), the worker shall be provided with, trained on the use of, and shall wear, appropriate respiratory protection.

- Respiratory protection must be donned before entering the hazardous environment and continued to be worn until the hazard can be removed from the workplace or reduced to an acceptable level.
- All personnel who may be required to use respiratory protective equipment shall be properly trained in the selection, use, and care of all the types of respiratory protective equipment which they may be expected to use in their work activities.
- All employees, contractors, sub-contractors, and others on site who may require respiratory protective equipment for work or rescue activities must be clean shaven where the respirator face-piece seals with the face.
- All Tallman Geological field personnel will be fit tested for a personal face-piece prior to working in the field.
- Contact lenses are not recommended in field operations when required to wear a respirator due to low humidity, chemical fumes, low oxygen levels and the potential for lenses to fall into critical face mask components.

Tallman Geological will provide the necessary respiratory protection for its employees. Contractors and sub-contractors must ensure respiratory protection for their respective employees is worn and be able to produce training certification upon request.

For any H2S (sour) service exposure please refer to the H2S Code of Practice in Appendix B.

3.5.5.4 Foot Protection

Workers are required to wear CSA approved footwear. Footwear must meet the following minimum requirements:

- 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.
- Footwear must be constructed of substantial material such as leather or other non-absorbent (non-canvas uppers) material and must have a minimum height of 150-mm (6”) to minimize ankle injuries.
- Soles must be rated for oil and slip resistance.
- Rubber boots should be used for handling hazardous materials or when working in adverse weather conditions.

3.5.5.5 Hearing Protection

All workers on Tallman Geological worksites who may be exposed to noise levels that exceed the OH&S regulations are required to wear appropriate CSA approved hearing protection to protect their hearing until the noise level is reduced to an acceptable level.

- Hearing protection (insert-able earplugs or earmuffs) must be worn in posted areas or where noise levels exceed 85 dBA. The protection must attenuate noise levels to below occupational exposure levels.
- Where noise levels exceed 96 dBA dual hearing protection (insert-able plugs & muffs) must be worn.

Tallman Geological will provide the necessary hearing protection for its employees.

3.5.5.6 Hand Protection

There are various styles of gloves; each designed for a specific type of job. Workers must wear the correct style for the job. Gloves must address hazards specific to the task.

3.5.5.7 Protective Clothing

Workers are required to wear CSA approved fire-retardant protective coveralls on all worksites with requirements listed below.

- Protective clothing, in conjunction with other personal protective equipment requirements, will aid in minimizing or eliminating exposure to these hazards.
- Fire retardant work wear shall be worn whenever an employee enters a worksite.
- Protection must be full body coverage from neck to ankles and wrists including high visibility stripping on front, back, wrists and pant cuffs. All fire-retardant work wear that is selected for use must meet or exceed the requirements established in the CSA.
- All outerwear must be kept clean and cleaned according to manufacturer's recommendations to provide adequate protection as intended.
- The outer layer must be fire retardant.
- Clothing worn under FR coveralls must be a natural fiber fabric (cotton, wool). Synthetic clothing made from acrylic, acetate, polyesters and nylon are not allowed on live operating sites as they tend to melt or sustain flame when exposed to heat or fire.
- When handling chemicals on-site, rubber suits or aprons or combinations of both should be worn.
- All other body protection will be addressed through hazard assessment.
- Tallman Geological will provide the necessary fire-retardant coveralls for its employees.

Note: Please refer to the Fire-Retardant Work Wear Code of Practice found in Appendix B.

3.5.6 Health and Hygiene Hazard Controls

There are four main classes of hazards that are of concern in occupational health and hygiene:

- Chemical hazards, such as solvents, welding fumes, and vehicle exhaust and paint vapors.
- Physical hazards, such as noise, ionizing radiation (X rays), non-ionizing radiation (microwaves, lasers), vibration, pressure and temperature extremes.
- Biological hazards, such as hanta virus, tuberculosis, ventilation system microorganisms, hepatitis virus, Covid 19 etc.
- Psycho-Social hazards, such as working conditions, fatigue, stress, workplace violence, material handling and equipment design (control location and display interpretation).

Workers play a role in the protection of their health by being aware of the hazards and by using the controls that are in place to protect them.

Employers must protect the health and safety of their workers by:

- Identifying hazards and using engineering controls, administrative controls, and PPE to ensure that workers are not overexposed to chemicals, noise and other hazards.
- Ensuring that information (i.e. labels and Safety Data Sheets) is available at the worksite and that workers are educated concerning the hazards of the chemicals and their safe use.

Workers have the obligation to:

- Cooperate with their employer to protect their own health and safety and that of others at the work site.
- Participate in training and instruction and apply the information to protect their health.
- Follow procedures to minimize exposure and refuse work that they believe will pose an imminent danger to themselves or other workers.

Workplace health concerns should first be reported to a supervisor. It is important for workers to have an informed understanding of effects and symptoms of chemical exposure because:

- A worker complaint may be the first indication of over-exposure to an unidentified hazard.
- A worker complaint may indicate failure of a control method.
- It can help the Occupational Hygienist to determine the cause of over-exposure.
- It is the basis for diagnosis and treatment by the occupational health physician.
- It may be necessary to protect sensitive workers, such as asthmatics or pregnant women.

3.5.7 Safe Work Permits

A Safe Work Permit is a written record that authorizes specific work at a specific work location for a specific duration of time. It is an agreement between the issuer and the receiver that documents the conditions, preparations, precautions, and limitations that must be clearly understood before work commences. It is designed to ensure all workers engaged in hazardous work, other than normal operating activity, are not exposed to undue risk.

- It is a checklist to ensure necessary safety precautions have been taken prior to beginning the work.
- It reminds workers of the necessity to perform work safely when working; and
- Safe Work Permits help control and coordinate work to establish and maintain safe working conditions.
- Permits verify that all foreseeable hazards have been considered and that the appropriate precautions are defined and carried out.
- The permit records the steps to be taken to prepare the equipment, building or area for the work and the safety precautions, safety equipment or specific procedures that must be followed to enable the worker(s) to safely complete the work.
- From an industry and regulatory standpoint, in non-routine, high risk situations, a Safe Work Permit is the document of choice for effectively controlling the work site.

The Safe Work Permit will aid in the identification and control of hazards but will not, by itself, make the job safe. A safe work permit system coupled with company policy and safe work practices will significantly reduce the possibility of incidents and injuries. This is achieved by identifying and addressing all potential hazards prior to beginning any procedure.

3.5.8 Workplace Hazardous Materials Information System (WHMIS)

WHMIS is an information system about hazardous and potentially hazardous materials found in worksites. In keeping with WHMIS legislation, Tallman Geological requires the following:

- All controlled products on Tallman Geological worksites shall have the appropriate WHMIS labels affixed.
- SDS (Safety Data Sheets) for all controlled products on each Tallman Geological worksite shall be kept on-site and freely accessible to all workers on all shifts.
- All workers (including contractor workers) on Tallman Geological worksites shall be fully trained in understanding and using WHMIS.

3.5.8.1 Supplier Labels

The legislation requires suppliers to affix supplier labels on all containers of controlled products delivered to customers. Under normal circumstances, Tallman Geological workers shall not accept delivery of controlled products unless each container of controlled product has a supplier label attached.

Under exceptional circumstances, Tallman Geological may accept delivery of unmarked containers, but these must be stored and not used until such time as a proper supplier label (or worksite label) is attached to the containers.

For bulk products (such as diesel fuel), Tallman Geological will ask the supplier to provide a supplier label which the Tallman Geological worker will then affix to the container. For example, a bulk fuel supplier will bring a "diesel fuel" supplier label to the location and the Tallman Geological representative will attach this label to the diesel fuel tank on location.

3.5.8.2 Workplace Labels

WHMIS legislation requires that Workplace Labels contain the following information:

- The product names.
- Safe handling precautions.
- A reference to the SDS.

Although Tallman Geological will endeavor to use a standardized workplace label, note that a workplace label need not be a commercially obtained sticker. Workplace labels may be written on plain paper and then attached to the container or written directly onto the container providing that the label is durable and legible.

WHMIS workplace labels shall be affixed to the following:

- Any container containing a controlled product which has been transferred from a supplier-labeled container,
- Any container where the supplier label is unreadable,

The following containers:

- chemical barrels.
- diesel fuel tanks.
- gasoline fuel tanks.
- lubricant storage tanks (including day tanks).
- varsol storage tanks.
- propane cylinders.
- nitrogen cylinders; and
- breathing apparatus (usually placed on the hard-shell case).

Workplace labels, warning signs, symbols, color coding, process flow charts or piping diagrams, combined with worker education, may be used on process piping, vessels and tanks. The worker must be able to readily identify the contents of process equipment.

3.5.8.3 Safety Data Sheets (SDS's)

Safety Data Sheets contain detailed technical information that may be vital to the health and safety of workers. In the absence of any specific Tallman Geological policy for the handling of a hazardous material, Safety Data Sheets are to be referred to when information is required for the following:

- The use, handling, storage or disposal of controlled products.
- First aid information; and
- Emergency procedures.

The legislation requires suppliers to supply a Safety Data Sheets with the first shipment of a controlled product. Although it is not required by law, Tallman Geological will request that suppliers send a Safety Data Sheets to all worksites with each shipment of a controlled product. No controlled product may be used on a Tallman Geological worksite unless the Safety Data Sheets for that product is present.

The Safety Data Sheets shall be kept on site in such a fashion that they are freely accessible to all workers on all shifts.

3.5.8.4 Sample Supplier Label

Product K1 / Produit K1

Danger

Fatal if swallowed.
Causes skin irritation.

Precautions:

Wear protective gloves.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Store locked up.
Dispose of contents/containers in accordance with local regulations.

IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice or attention.
Take off contaminated clothing and wash it before reuse.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor.
Rinse mouth.

Danger

Mortel en cas d'ingestion.
Provoque une irritation cutanée.

Conseils :

Porter des gants de protection.
Se laver les mains soigneusement après manipulation.
Ne pas manger, boire ou fumer en manipulant ce produit.

Garder sous clef.
Éliminer le contenu/récipient conformément aux règlements locaux en vigueur.

EN CAS DE CONTACT AVEC LA PEAU : Laver abondamment à l'eau.
En cas d'irritation cutanée : Demander un avis médical/consulter un médecin.
Enlever les vêtements contaminés et les laver avant réutilisation.
EN CAS D'INGESTION : Appeler immédiatement un CENTRE ANTIPOISON ou un médecin.
Rincer la bouche.

Compagnie XYZ, 123 rue Machin St, Mytown, ON, N0N 0N0 (123) 456-7890

3.5.9 Transportation of Dangerous Goods (TDG)

Tallman Geological will comply with the clear language TDG Regulations when receiving or transporting regulated materials. All field personnel shall be trained and certified as required by the TDG Regulations.

Petroleum and chemical products are inherently hazardous. The hazards are a concern when:

- Products are accidentally or deliberately released.
- People enter areas where the products are present; or
- Products are used, stored and disposed.

The next most common hazards associated with hazardous products are:

- Toxic effects, both immediate and long-term, on humans and wildlife.
- Fire and explosion.
- Burn or frostbite; and
- Environmental damage.

For specific hazard and risk control information, refer to the Safety Data Sheet and shipping information for the product. When implementing measures to control hazards, the emphasis must be on engineering controls and safe work practices.

3.5.10 Driving Safety

All employees required to operate a vehicle on behalf of Tallman Geological shall hold a valid driver's license for the class of vehicle being operated. Employees shall report any change in the status of the driver's license to their supervisor immediately. Tallman Geological reserves the right to obtain driving abstracts.

Drivers shall operate vehicles in a safe and legal manner and use vehicles only for the purposes for which they are designed. Drivers are personally liable and responsible for federal, provincial and community violations.

All signs governing the movement and parking of vehicles on any worksite shall be observed.

Approved head protection shall be used when operating snow vehicles or all-terrain vehicles (refer to Personal Protective Equipment in Section 2.0)

3.5.11 Smoking

Smoking is prohibited by provincial legislation in all public spaces and workplaces. Smoking is only permitted in a safe, designated off-site areas.

3.6 Working Alone

Legislation from all provinces includes specific rules covering situations where employees work alone. If an employee is working alone, they are a lone worker if the employee works alone where assistance is not readily available when needed.
Tallman Geological will, wherever possible, eliminate the risk of employees working alone as well as comply with the working alone provisions for operations where employees must work alone.

The four elements of working alone are:

- **Conduct a hazard assessment**
  Closely examine and identify existing or potential safety hazards in the workplace. The assessment must be completed and communicated to all affected staff. Where practicable, employers must also involve affected employee(s) in conducting the hazard assessment and in the elimination, reduction or control of the identified hazards.
- **Eliminate or reduce the risks**
  Employers must take practical steps to eliminate the hazards identified. If it is not practicable to do so, employers must implement procedures to reduce or control the hazards.
- **Establish an effective means of communication**
  Employers must have a communication system for employees to contact other people who can respond to the employees' need. The system must be appropriate to the hazards involved.
- **Ensure employees are trained and educated**
  Employers must ensure their employees are trained and educated so they can perform their jobs safely. Employees must be made aware of the hazards of working alone and the preventive steps that can be taken to reduce or eliminate potential risks.

These rules consider a wide variety of situations where employees work alone. Their intent is to require employers to consider the hazards specific to their work sites and to adopt safety measures that address these hazards.

The following are safe work procedures for employees working alone:

- Information on unfamiliar higher risk geographical areas and their associated conditions should be obtained (where feasible) and recorded.
- In higher risk areas, Tallman Geological will usually involve more experienced personnel and or those familiar with the area. Where practical, an area familiarization tour may be conducted, particularly for new staff.
- Workers will always be provided with a means for emergency communication (cell phone or radio).
- Workers will ensure communication devices operate properly by conducting periodic checks at the beginning of a shift and during the shift.

- Workers will call in to a pre-determined designate or answering service when starting out on a trip into a remote area and will advise the contact person as to their expected time of arrival at their destination. This information will be recorded by the contact and kept on file.

- When the worker arrives at their destination or at a pre-determined interval, they will again call the pre-determined designate or answering service to confirm their safe arrival.
- If a worker fails to call in when expected, the service contact person will attempt to call them three times. In a situation where they are unable to contact the worker after three attempts, they will contact the worker's immediate supervisor who at that will initiate a search and may also implement the Emergency Response Plan.

3.7 Workplace Violence

Provincial OH&S legislation requires employers to provide their employees with a safe and healthy work environment. Legislation details specific requirements employers must carry out to prevent workers from being harmed through workplace violence

It is the intent of Tallman Geological to provide a workplace for all employees, contractors, clients and visitors that is free from violence by establishing preventive measures, holding perpetrators of violence accountable and by aiding and supporting victims. Committing violent acts, whether on duty or off duty, has the potential to impact a worker's ability to perform their job.

3.7.2 Definitions

Workplace Violence includes, but is not limited to, intimidation, threats, physical attack, domestic violence or property damage and includes acts of violence committed by company employees, clients, customers, relatives, acquaintances or member of the public against company employees in the workplace.

- **Intimidation** is engaging in actions that includes but is not limited to stalking or behavior intended to frighten, coerce or induce distress.
- **Physical Attack** is unwanted or hostile physical contact such as hitting, fighting, pushing, shoving or throwing objects.
- **Domestic Violence** is the use of abusive or violent behavior, including threats and intimidation, between people who have an ongoing or prior intimate relationship. This could include people who are married, live together or date or who have been married, lived together or dated.
- **Property Damage** is intentional damage to property and includes property owned by the company, employees, visitors or vendors.

3.7.3 Implementation

All employees are encouraged to be alert to the possibility of violence on the part of employees, former employees, customers, and the public. Employees shall place safety as their highest concern and shall report all acts of violence and threats of violence immediately. All reports of violence will be handled in a confidential manner, with information released only on a need-to-know basis. Management shall be sensitive and responsive to the reporting employees' fear of reprisal.

- The incident procedure will be used when investigating a report of an incident involving any form of violence.
- Employees will be instructed regarding proper response to acts or threats of violence.
- The discipline guideline of the company will be used after the investigation if warranted.

3.8 Fit for Work Guideline

Tallman Geological will provide a safe working environment that minimizes any negative effects due to fatigue, the use of drugs (prescription, over the counter or illegal), alcohol or psychological stability. This applies to all on-site personnel (employees and/or contractors).

- Use, possession, distribution, offering or sale of illicit drugs, illicit drug paraphernalia or drugs for which a prescription is legally required, is prohibited.
- Use, distribution offering for sale of alcoholic beverages except where there has been senior management approval for specific business, social and recreation functions, is prohibited.
- Being unfit for work due to the use of or aftereffects of alcohol or illegal drugs, or as the result of the intentional misuse of medication (licit drugs) is prohibited.
- If personnel have any concern as to their ability to safely perform their jobs while taking a prescription drug or other medication, they have the obligation to report the use of the drug to their supervisor.
- Violations of the policy may be grounds for disciplinary action, including corrective counselling, and/or termination of employment, and where applicable reported to law enforcement agencies.

Any person may be temporarily held out of service, placed on modified work or reassigned, pending completion of an investigation into possible violation of this guideline.

3.9 Disciplinary Guideline

Workers are expected to perform their jobs safely and efficiently, in accordance with company standards and applicable laws. Where workers are noticed working unsafely, suitable disciplinary actions shall be taken for safety infractions which may encompass a verbal warning, written warning, suspension and/or termination.

Management and supervisors are responsible for ensuring that the safety expectations are communicated, enforced, and adhered to by all employees and contractors.

Managers are responsible for implementing one or more of the following disciplinary sanctions against an employee depending on the frequency and severity of the breach of the guideline by an employee or contractor. The following typical steps will normally be taken in the disciplinary process:

- **Verbal Reprimand**: Discuss the violation and warn the employee of more severe action should the offense be repeated (document).
- **Written Reprimand**: Discuss the violation and give the employee a written reprimand. A copy of the written reprimand should be placed on the employee's file.
- **Suspension With/Without Pay**: The period of the suspension is determined by the severity of the misconduct. In some cases, it should be made clear that discharge will result if the offence is repeated.

- **Discharge:** May be implemented in the event of a serious violation of company policies or guidelines, laws or regulations, or when the violation results in serious negative consequences to the company.

Note: For a serious safety infraction such as driving or working under the influence of alcohol, illegal drugs or total disregard of safety rules and/or practices, disciplinary action up to and including immediate termination may be implemented.

3.10 Monitoring

Hazard identification and control will be carried out as a regular part of worksite inspections conducted where Tallman Geological is employed.

Management, site representatives and foremen will ensure that a hazard assessment is conducted and hazard control methods are in place before work is started at a site and on a regular basis while work is carried on to prevent the development of unsafe and/or unhealthy working conditions.

In the event of an incident or injury at the site, management shall ensure that part of the incident investigation includes a hazard identification and assessment process, and a review of the hazard control process to determine whether the control methods were not in place or not effective in preventing the incident.

When there are changes to a work process or operations at the site, management shall ensure that a new hazard identification and risk assessment is carried out and any new control method required is implemented.

If a new work process is introduced, management shall ensure that a new hazard identification and risk assessment is carried out and any new control methods are in place, effective and being used by workers and contractors.

3.11 Review/Follow Up

Tallman Geological standards and requirements for hazard identification, risk assessment and hazard control methods will be reviewed as a part of the regular review of the Health and Safety Management System; whenever the applicable OH&S Legislation is updated or in the event of a serious incident.

The hazard identification and control section of the Tallman Geological Health and Safety Management System will be reviewed annually as a part of internal audit protocol.

This page has been left blank intentionally

4.0 ORIENTATION AND TRAINING

4.1 Purpose

Training and skill development are of critical importance to an effective safety program. Workers with appropriate skills training contribute to safety and productivity. Through their technical competence they reduce injury incidents and damage to the environment and equipment.

Tallman Geological is committed to providing all employees with the training necessary to work safely and effectively. The training should also provide employees with the critical information they require to deal with emergency situations and to protect themselves from injury.

This section outlines the company's minimum standards for the orientation and training for contractor management, supervisors, and workers.

4.2 Responsibilities

Management, supervisors, and site representatives are responsible and accountable for ensuring that workers are competent to carry out the work that is assigned to them. Where the work is a "critical task", only workers who have been assessed and verified as competent will be assigned to the job.

Employees are responsible for ensuring their training needs are met and to identify any specific requirements to their supervisor. Employees and contractors are also required to notify their supervisor if they are expected to carry out any task for which they are not competent. This includes a lack of knowledge, skills or experience to carry out the work safely. Any refusal to carry out work that may be an imminent danger must be documented and addressed by the supervisor.

4.3 Standards

OH&S Regulations: Saskatchewan OH&S Regulations – General Duties

Legislation requires that the employer ensures workers are "competent" to carry out work assigned to them that may be hazardous. Competent can be defined as: "adequately qualified, suitably trained and with sufficient expertise to carry out work without supervision, or with minimal supervision."

4.4 Implementation

The Tallman Geological Health and Safety Management System addresses the employer's responsibility for ensuring workers are trained and competent to carry out the work they are assigned through the following:

- Safety orientations.
- Safety meetings.
- On-the-job training.
- Personal coaching; and
- Refresher/update training.

If a supervisor or manager identifies a gap between the job requirements and the employee's skill and knowledge level, they will be responsible to ensure that appropriate training is carried out to remedy the deficiency.

Wherever appropriate, training shall include a measurement of the skills and knowledge acquired during the training as well as feedback from the employee on the usefulness and effectiveness of the training methods used.

4.4.1 Health, Safety & Environment Program Orientation

All new Tallman Geological employees, contractors or consultants who will be acting as Tallman Geological designated representatives must receive the HSE Program orientation on the safety program prior to the worker commencing their first shift.

The safety orientation must include the following elements and be signed off as completed and understood by the employee. The acknowledgement record is retained by Tallman Geological:

- Overview of key elements of the Tallman Geological Health and Safety Management System.
- Supervisor, contractor, and employee safety responsibilities.
- Due diligence.
- Worker's right to refuse unsafe work.
- Hazard assessment and control.
- Incident reporting procedures.
- Safe work procedures and codes of practice.
- Training requirements.
- Contractor management.
- Emergency response plans.
- Environmental protection.
- Stakeholder engagement.
- Personal protective equipment requirements.

4.4.2 Site Specific Orientations

All personnel on-site must receive a site-specific orientation prior to the work commencing. Site specific orientations highlight local hazards and controls associated with the immediate work to be performed. This will include safety responsibilities, required PPE, the location of emergency equipment, emergency protocols to follow and muster areas.

4.4.3 Training Requirements

The following safety training is required by Tallman Geological:
General Safety Orientation (Enform)
WHMIS
TDG
Standard First Aid / CPR (Level A or C)
H2S Alive

4.4.4 On-the-Job Training

Prior to any worker being deemed competent to perform their job function, that worker must receive on-the-job training from a competent person. The immediate supervisor is then responsible to ensure that the worker is competent to perform their assigned job function.

Critical tasks are those tasks that, if performed improperly, are likely to result in serious injury, major equipment damage and/or loss of production.

4.4.5 Contractor Management

In compliance with occupational health and safety regulations, Tallman Geological insists on safe work performance throughout its operations, including those tasks carried out by contractors. Contractors must comply with government regulations and company safety standards.

4.5 Monitoring

Management, supervisors, and site representatives are responsible and accountable for ensuring that workers are competent to carry out the work that is assigned to them. The performance review process at Tallman Geological Will include an evaluation of how well employees carry out these responsibilities for their crew or shift members. Employees will also be assessed to ensure they are participating in the required training and acquiring or maintaining the competency levels required for their job.

4.6 Review/Follow Up

The hiring, training and orientation process is an integral part of the Tallman Geological Health and Safety Management system. The effectiveness of these elements will be evaluated as a part of the annual internal safety management review process within Tallman Geological.

Training requirements will be updated whenever the applicable OH&S Legislation is updated and will be reviewed in the event of a serious incident.

This page has been left blank intentionally.

5.0 INSPECTIONS

5.1 Purpose

The safety inspections section is a proactive element of the Tallman Geological Health and Safety Management System. Planned inspections provide a means to identify and correct hazards before losses occur. Safety inspections and audits facilitate open communication through all levels of the organization.

The objectives of inspections are to:

- Identify potential hazards, substandard actions and substandard conditions.
- Identify equipment deficiencies.
- Assess the impact of change; identify any problems in remedial actions, problems due to procedural changes and/or new equipment.
- Evaluate the effectiveness of the safety program.
- Serve as a leading indicator to reduce the impact and frequency of incidents or loss events.
- Demonstrate management's commitment to health and safety.

5.2 Responsibilities

Informal inspections are to be conducted by workers and supervisors as part of their normal daily job duties.

Planned inspections are to be conducted by competent, experienced personnel using prepared checklists at a set frequency to identify hazards and to follow legislated requirements.

The Tallman Geological site representative will confirm that all equipment used on a site has been thoroughly inspected, shop serviced, tested and certified.

Specialized inspections shall be conducted by technically competent personnel at intervals specified by the agency having jurisdiction.

5.3 Standards

OH&S Regulations: Alberta OH&S Act - Chapter 1 – Key Responsibilities
Saskatchewan OH&S Act - Part 2 – Division 3 Duties
British Columbia OH&S Regs - Part 3 – Division 3 – General Duties

5.4 Implementation

5.4.1 Types of Inspections

Informal Inspections

Informal inspections involve noting apparent or potential hazards, substandard conditions, or actions and, if possible, immediately correcting the problem or notifying the supervisor to initiate corrective actions.

Informal inspections shall be conducted by workers and supervisors as part of their normal daily job duties.

Planned Inspections

Planned (formal) inspections are systematic examinations of Tallman Geological operations, tools, and material and how workers are using these items. Planned inspections shall be conducted by competent and experienced personnel using prepared checklists at a set frequency based on hazards and legislative requirements.

Specialized Inspections

Specialized inspections are those required by legislation or certifying agencies having jurisdiction (such as WHS, AER, ECON, BCOGC), or recommended by industry codes, consensus, and practices.

Specialized inspections shall be conducted by technically competent personnel at intervals specified by the agency having jurisdiction.

Supervisors shall promptly review all inspection reports and communicate with the site representative or contractor to ensure prompt correction of deficiencies.

5.4.2 Inspection Reports

The results of all inspections shall be recorded in an appropriate format using forms designated for the type of inspection. All inspection reports are retained and reviewed.

5.4.3 Informal Inspections

For informal inspections, workers and contractors shall utilize the appropriate Tallman Geological inspection checklist.

5.4.4 Planned Inspections

Planned inspections shall be recorded on an Inspection Checklist for the operation or location visited. The checklist shall be supplemented by additional notes.

The planned inspection form can be an effective communication tool to identify the potential for loss posed by a hazard or substandard condition, and to establish priorities for remedial action.

5.4.5 Specialized Inspections

The technically competent individual or organization conducting a specialized inspection shall submit a report meeting at least the following criteria, as applicable:

- Name and address of firm conducting the test/inspection.
- Name of individual in charge of the test/inspection procedure.
- Owner of equipment.
- Facility and location.
- Type of equipment and unique identifier.
- Inspection results.
- Recommended remedial action.

5.4.6 Recommendations for Specialized Inspections

All equipment requiring specialized inspections shall be completed in accordance with regulatory requirements and manufacturer's specifications.

5.4.7 Rig Inspections

Drilling rigs, service rigs or snubbing units must be inspected by a competent worker or contractor representative before the rig is placed into service.

A rig must be inspected every 30th day it is used for as long as it is in service (every 7th day in Alberta).

5.4.8 Fire Extinguishers

A complete inventory of fire extinguishing equipment shall be compiled for each mobile unit. All fire extinguishing equipment must be inspected by operating personnel monthly and be serviced annually by a technical service company. Monthly inspections must be recorded.

All fire extinguishing equipment must be tagged with the date of service and who serviced the unit.

5.4.9 Equipment Preventative Maintenance

Proper equipment maintenance is a preventive measure against incidents and costly breakdowns of all equipment including pressurized vessels, rotating equipment, personal protective and safety equipment.
Operators of equipment are responsible for bringing any equipment or machine deficiencies to the supervisor's attention.

5.5 Review/Follow Up

Tallman Geological standards and requirements for Inspections will be reviewed as a part of the regular review of the Health and Safety Management System, whenever the applicable Occupational Health and Safety legislation is updated or in the event of a serious incident.

The inspections section of the Tallman Geological Health and Safety Management System will be reviewed annually as a part of internal audit protocol.

This page has been left blank intentionally.

6.0 INCIDENT REPORTING AND INVESTIGATION

6.1 Purpose/Overview

The reporting and investigation of incidents is an important component of Tallman Geological Health and Safety program. In the reporting, investigation and analysis process, there are three basic facts to remember:

- Incidents are caused.
- By identifying and eliminating causes, future incidents can be realistically prevented.
- Unless the causes are effectively eliminated, the same incidents will happen again.

There is a strong link between the incident investigation process and the hazard assessment program, since many hazards not previously considered to present a high risk to workers will require a further review of their potential risk based on the findings in the incident investigation.

6.2 Responsibilities

6.2.1 Personnel and Site Representatives

Tallman Geological shall verbally report all incidents to their immediate site supervisor as soon as possible. They shall also submit an initial written incident report within 24 hours of the event.

6.2.2 Supervisor

The supervisor along with appropriate EHS support shall ensure that all proper authorities receive verbal notification as soon as reasonably practical and written notification within 24 hours (i.e. Tallman Geological management, WHS, WCB, RCMP, AER, ABSA, ECON and BCOGC as applicable).

6.2.3 Management

Management must examine incident reports to ensure the effectiveness of the recommendations and to provide the resources required to implement the corrective measures.

6.3 Standards

OH&S Legislation: Saskatchewan OH&S Regs - Part III General Duties

6.4 Implementation

6.4.1 Action to be taken Following an Incident

The immediate supervisor must initially investigate all incidents and make recommendations to prevent recurrences. For higher risk or complex incidents, Tallman Geological EHS Group will be involved to determine root causes and preventative measures.

6.4.2 Incident Reports

The initial report will require incident information including who, what, where and when. Why and how will be determined through an investigation.

All incident reports must contain the following:

- **Description:** This is a clearly written description of how the incident occurred, using all information gathered from the incident investigation. The description may include attached statements, sketches, or photographs.

- **Analysis:** The analysis identifies the basic and root causes of the incident. The supervisor/H&S Advisor analyzes all the information gathered from the investigation and records this on the Incident Report Form.

- **Prevention:** This section should list all actions taken to prevent further losses from similar incidents or recommendations for future actions. This includes the actions of management, supervisors and the workers themselves (i.e. new work procedures, constant supervision for critical work, expansion of basic training requirements for new employees and other precautionary measures).

- **Follow-Up:** The corrective action section contains the name of the person who performs the corrective actions, the date by when the actions must be completed and complete detail of what was done. Further recommendations could also be included if necessary.

6.4.3 Injury Classification

All injury incidents must be classified as either first aid, medical aid, modified work, or lost time. Tallman Geological follows the Canadian Association of Petroleum Producers (CAPP) Reporting of Injuries Guideline.

6.4.4 Supplemental Reports

In addition to the company's reporting procedures, outside agencies may require supplemental reports. Listed below are the agencies requiring reports and what each agency requires:

6.4.5 Reporting Requirements by Province

6.4.5.1 Saskatchewan WCB

The employer must report all workplace injuries that require medical treatment or prevents worker from earning full wages within five days of becoming aware of injury. Submission can be made by phone or online, (refer to Appendix A – References for phone number).

6.4.5.2 Saskatchewan Occupational Health and Safety

The employer or contractor must notify Saskatchewan Labor Relations and Workplace Safety – OH&S Division verbally as soon as possible for any incident that has or may cause death of a worker or will require a worker to be admitted to a hospital for a period of 72 hours or more. The notice must include:

- Name of injured worker
- Name of the employer
- Date time and location of the accident
- Circumstance of the accident
- Apparent injuries
- Name and phone number of the employer to be contacted for additional information, (refer Appendix A – References for phone number).

6.4.5.3 Alberta WCB

The **employer** must verbally report to WCB within **72 hours** of being notified, or being aware of, any injury that would cause a worker to be off duty beyond the day of the injury or be placed on modified work. A report should also be submitted if the injury results in, or is likely to result in the need for medical treatment beyond first aid (assessment by physician, physiotherapy, etc.) or will incur medical aid expenses such as dental treatment, eyeglass repair or replacement, or prescription medications.

6.4.5.4 Alberta Workplace Health and Safety

The **prime contractor** must be reported immediately to Workplace Health and Safety any incident that results in a fatality or causes a worker to be admitted to hospital for more than two days. Do not wait for the two days to confirm it is a reportable injury. If the injury is serious enough that it may cause a worker to stay in the hospital for more than two days, report immediately.

Notification is made through Alberta Workplace Health and Safety Contact Center (refer to Appendix A – References for phone number).

As **prime contractor**, be prepared to provide the following information when notifying:

- Location
- Site contact name job title and number
- General details of incident
- Time and date the injury occurred
- Name of employer
- Employer's role at worksite (Prime, contractor, supplier)
- Injured worker's name date of birth and job title
- Name and location of hospital injured worker was taken to.

If incident happened at a well site, must also provide:

- Name of rig manager
- Well site supervisor's name and phone number
- Name of drilling company and phone number
- Rig number

Obviously, prime contractor will need to be in contact with the injured person's employer to obtain information.

6.4.5.5 Manitoba WCB

Employer must report an injury within **five business days** of the day of the injury or becoming aware of the injury. A reportable injury is if worker misses any time from work or visits a health care provider for treatment. Reporting to WCB can be by phone, or online.

6.4.5.6 Manitoba Workplace Health and Safety

The **employer** must report **immediately** any serious incident occurring at a worksite to Workplace Safety and Health (refer to Appendix A – References for phone number). A serious incident is defined as an incident in which a worker is killed or in which a worker suffers from:

- an injury resulting from electrical contact,
- unconsciousness as the result of a concussion,
- a fracture of his or her skull, spine, pelvis, arm, leg, hand or foot,
- amputation of an arm, leg, hand, foot, finger or toe,
- third degree burns,
- permanent or temporary loss of sight,
- a cut or laceration that requires medical treatment at a hospital, or
- asphyxiation or poisoning

With notification employer must provide:

- the name and address of each person involved in the incident;
- the name and address of the employer, and if any person involved in the incident is employed by another employer, the name and address of that other employer;
- the name and address of each person who witnessed the incident;
- the date, time and location of the incident;
- the apparent cause of the incident and the circumstances that gave rise to it.

6.5 Monitoring

All incidents and corrective actions will be reviewed at monthly safety meetings and the findings discussed with employees. Site supervisors/management will ensure that all required action items are carried out and that follow up is completed on all items identified.

6.6 Review/Follow Up

To determine the effectiveness of the incident reporting, investigation and analysis strategies described in this section, the company will conduct an annual review of the process. The incident management section of the Tallman Geological Health and Safety Management System will be reviewed annually as a part of internal audit protocol.

This page has been left blank intentionally.

7.0 EMERGENCY PROCEDURES AND RESPONSE

7.1 Purpose

Emergency Procedures ensure responses to emergencies are prompt, organized and effective.

Emergency Procedures:

- Outline the responsibilities of key people at the emergency site and at the office.
- Provide various emergency and post-emergency procedures.
- Include lists of emergency contacts.

7.2 Responsibilities

7.2.1 Management and Site Representatives

Tallman Geological management, site representatives and contract supervisors are responsible and accountable for assessing the worksite and identifying any potential emergency situations before work begins at the worksite.

Management is responsible for ensuring procedures are developed and implemented.

Site supervisors are responsible for making sure workers are aware of the procedures to follow in the event of an emergency by testing the site emergency plan. Minimum requirements include clarification of the location of the muster point, identification of the signal/alarm device, testing the system and documenting the test.

7.2.2 Workers and contractors

Workers and contractors are responsible for following procedures and ERPs in the event of an emergency.

7.3 Standards

OH&S Legislation - Saskatchewan OH&S Regs - Part III – General Duties

7.4 Implementation

7.4.1 First Aid Requirements

Tallman Geological will ensure that first aid services, equipment and supplies are:

- Located at or near the worksite that they are intended to serve, and
- Available and accessible during all working hours and that the equipment and supplies are:
- Maintained in a clean, dry and serviceable condition.

- Contained in a material that protects the contents from the environment; and
- Clearly identified as first aid equipment and supplies.

In addition, there is an emergency communication system in place to summon first aid and medical services. As employees may be required to work alone it is a requirement of Tallman Geological that all permanent full-time employees and contractors have a first aid certificate.

7.4.2 First Aid Records

Tallman Geological requires all injuries be reported and records for first aid treatment maintained and include the following information:

- The name of the employee.
- The name and qualifications of the person giving first aid.
- The date and time of the acute illness or injury.
- The date and time the acute illness or injury was reported.
- A description of the acute illness or injury, where it occurred and the cause; and
- The first aid provided.

Note: All written First aid reports are to be kept confidential. Files will be retained for at least three years. No records are to be kept in the first aid kit.

Access to first aid records is restricted to:

- Individuals requiring access, use and disclosure of the information for the purpose of:
- Medical treatment.
- Work site inspections.
- Incident investigations; or
- Evaluation of health and safety programs and statistics; and
- The Workers' Compensation Board for the purposes of worksite health and safety programs and statistics.

7.5 Wilderness Survival

7.5.1 Wildlife

There are no hard and fast rules about what to do when you are suddenly confronted with a wild animal such as a bear, a cougar or a wolf. Their reaction to humans will vary depending on the situations like sex, age, health, the season, how hungry they are or whether there is a litter of young amongst them. The following are some of the most common guidelines when traveling or working in the wilderness.

If you encounter a wild animal:

- Never approach or try to feed the wildlife. Although most will avoid any confrontation with humans, they are still very unpredictable and will become aggressive if it feels threatened.
- Stop where you are. Stay calm and talk to the animal in a quiet but confident voice.
- Do not turn your back on the animal. Face the animal, remain upright and avoid any direct eye contact.
- Do not run from the animal. You cannot outrun it! Slowly back up and give it an avenue of escape.

If the animal becomes aggressive:

- Do all you can to make yourself appear larger (i.e. open your jacket, stand on a stump, raise your arms and wave them about.)
- Arm yourself with a large stick. Make noise, throw rocks and speak loudly and firmly. Convince the animal that you are a threat, not a prey.
- Drop any personal items to distract them. Hold onto larger objects, such as a backpack, that could be used as a weapon in case of an attack.
- If the animal attacks, fight back. Use anything at hand to defend yourself. Throw rocks or sticks in the direction of the animal.
- If you carry bear spray, make sure it is kept within easy reach. Remember that it is only effective if sprayed directly in the animal's eyes and nose.
- Immediately report any confrontation with a wild animal with the nearest Conservation Office.

Other General Tips:

- Never come between a female animal and her cubs or kittens. If you stumble upon a wolf pup, bear cub or cougar kitten, do not approach or attempt to pick it up. Leave the area immediately as the female will defend her young.
- Avoid traveling into the wilderness alone. The larger the group, the less likely a wild animal will hang around.
- Make plenty of noise, talk loudly or ring bells. This will alert any wild animal of your approach so there is little chance of you surprising them.
- Watch for and learn to recognize the different animal tracks and signs. For example, cougars cover unconsumed portions of their kills with soil and leaf litter. Food sources, such as carcasses and berry patches indicate that bears may be in the area.

7.6 Winter Survival

- Stay in your vehicle. Trying to dig your way out of a ditch or attempting to walk back to town can be fatal. Do not leave your vehicle.
- Call 911 on your cell phone or use your radio to contact operations to let them know your location and predicament.
- Do not leave the engine running. If it is extremely cold you can idle the motor for a few minutes at a time but only after making sure the exhaust system is not damaged and the

tail pipe is clear of snow and debris. Carbon monoxide can sneak up on you without warning.

- Put on layers of warm clothing and wrap yourself in a blanket or sleeping bag.
- Ventilate the car by opening a downwind window (on the side away from the wind and blowing snow) approximately 1/2 inch.
- Use your water sparingly (you should keep two large bottles in your kit) but do not let yourself get dehydrated.

7.6.1 Emergency Survival Kit

Truck Kit (AB)	Truck Kit (SK)
1 – Triangle Flare kit (3 triangle flares) 1 – Blanket 1 – Ice Scraper 1 – Orange Cone 1 – Safety Vest 1 – Flashlight 1 – Survival Candle 1 – Emergency Survival Blanket 3 – Emergency Flares 1 – First Aid Kit	1 – Folding Shovel 1 – Ice Scraper 1 – Emergency Stove 1 – Emergency Blanket 1 – Hand Warmer 1 – Light Stick 1 – Waterproof Matches 1 – Emergency Survival Candle 1 – Mini First Aid Kit 1 – Folding Scissors 1 – Stainless Steel Cooking Cup 2 – Hot Chocolate 2 – Cup-a-Soup 2 – Tea Bags 2 – Sugar 2 – Granola Bars 2 – Spoons 1 – Winter Driving Guide 1 – Carry Bag

7.7 Wildfires

The risk of wildfires is high during the warm, dry summer months and forest and prairie wildfires can spread at an astonishing rate.

If you see smoke or a fire approaching:

- Report it immediately. Wait for any advice as to whether operations in the area will need to be shut down.
- Contact your supervisor for further instructions.

7.8 Emergency Transportation

Tallman Geological, through its representatives (Worksite Supervisors) must ensure that an emergency transportation plan is in place. Completion of the Emergency Transportation Plan form will determine the medical services required on the worksite, transportation method and times.

7.8.1 Sharing of First Aid Services

The regulations allow the company, in some cases, to comply with first aid requirements by placing a first aid transportation vehicle – suitable vehicle, emergency transport vehicle or ambulance – at a strategic location from which it can support more than one work site. This may be more efficient to provide First Aid Services for a group versus individually.

This is based on proximity to all the worksites involved. Proximity varies from jurisdiction to jurisdiction. Refer to the First Aid Requirement by Province found in Appendix C. Where shared services are utilized, the Worksite Supervisors need to be aware of when the transportation vehicle is positioned.

7.8.2 Special Conditions Worksite

A special conditions worksite is defined as a site where an activity is beyond the normal scope of activities and presents special risks inherent with the task (i.e.: fracturing, using energized fluids and multi-contractor congested work). Under these conditions serious consideration should be given to increasing first aid services available, above those required by the minimum standards. This could include having an ambulance and Paramedic/EMT on location.

7.8.3 Provincial Emergency Transportation Regulations

To assist in clarifying minimum requirements for the worksite, Appendix C identifies the individual provincial transportation, staffing, equipment, and worker training requirements, relevant to the distance from a medical facility and the number of workers on the worksite. Consideration must be given to changes in travel time to a medical facility and/or number of workers at the worksite.

This page has been left blank intentionally.

8.0 COMMUNICATION AND PLANNING

8.1 Purpose

Communication and planning are an integral part of any effective safety program. One of the common ways that companies ensure good communication processes is through conducting regularly scheduled safety meetings. Regularly scheduled, effective safety meetings result in critical information exchange and another opportunity to provide training.

Planning is a core component of all business processes. With effective planning the company can be aware of changes and develop strategies for ensuring change does not have an impact on the health and safety of the company's employees.

8.2 Responsibilities

Tallman Geological employees are responsible for ensuring communication strategies such as safety meetings are carried out. Contract company personnel who are on site during the meeting and representatives of regularly utilized contractors are required to attend.

8.3 Standards

OH&S Legislation - Saskatchewan OH&S Act – Division 4 Committees and Representatives

8.4 Implementation

The company will implement, at a minimum, the following formal meetings to ensure communications and planning strategies are carried out.

8.4.1 Contractor Meetings

Pre-Job Meetings

The pre-job meeting allows Tallman Geological the opportunity to communicate safety concerns to the site personnel. Pre-job meetings shall be held prior to the beginning of each new job, task or operation and every time the job scope changes. Simultaneous operations on a work site will require all personnel to meet and discuss job tasks and scheduling to ensure clear communications with all present and to prevent conflicting work.

A hazard review must be conducted daily or if the job scope changes with all workers involved in the job being done. If no JSA or SOP is available, then one must be created prior to any work starting.

While the meetings may be of brief duration, these should still address safe work procedures, work permits and a discussion of inherent hazards and controls. The duration of these meetings should be proportional to the hazard potential involved.
Safe work permits/hazard assessments may serve as the written record of the completion of the required safety meeting.

Regularly Scheduled Contractor Safety Meetings

Contractor safety meetings are conducted to maintain two-way communication, provide feedback, and provide a forum to negotiate and resolve outstanding issues. Minutes of these safety meetings will be kept to identify and record the disposition of outstanding items.

Any problems identified through hazard management or incident reporting shall be resolved during meetings between Tallman Geological and the site representative.

8.4.2 Internal Company Meetings

General Field Safety Meetings

General field safety meetings with supervisors and workers allow for two-way communication to discuss operational and safety issues.

Site supervisors, foremen, and all other persons on site are expected to attend all meetings. General safety meetings should review at a minimum timely and topical safety rules and policies, hazard assessment and controls, recent incidents and applicable regulatory issues.

8.4.3 Safety Meetings

All safety meetings will be documented. Any issues, safety concerns or action items for correction will be recorded for follow-up and will be signed off by all attendees. A copy of the minutes will be made available on-site and kept on file.

A copy shall be saved and retained as per the Tallman Geological record retention policy.

8.5 Monitoring

Tallman Geological shall review safety meeting records for completion and to verify content is appropriate.

8.6 Review/Follow Up

To determine the effectiveness of the communication strategies described in this section the company will conduct an annual review of the process.

The communication section of the Tallman Geological Health and Safety Management System will be reviewed annually as a part of the internal Environment, Health and Safety audit.

This page has been left blank intentionally.

9.0 EVALUATIONS AND AUDITS

9.1 Purpose

The Evaluation and Audits section is a highly proactive element of the Tallman Geological Health and Safety Management System. Evaluation of a safety program provides a means to identify and correct deficiencies before losses occur. Evaluations and audits facilitate open communication through all levels of the organization. This communication will help to identify and eliminate hazardous and potential loss conditions.

9.2 Evaluation

Program evaluation is an ongoing process that involves multiple levels of the organization in a regular evaluation of processes and conditions to ensure critical items are continually reviewed and kept up to the standards required.

Examples of evaluation strategies include:

- Daily site inspections.
- Safety equipment inspections.
- Fire equipment inspections.
- Vehicle inspections.

9.3 Safety Audits

Safety audits will be conducted on an ongoing basis to measure the effectiveness of the Tallman Geological Health and Safety Management System. The safety mechanisms that comprise the safety program are evaluated against established regulatory, industry and in-house standards.

Safety audits are conducted to measure the effectiveness and compliance to safety program elements such as:

- Management Commitment.
- Compliance and Responsibilities.
- Hazard Identification and Assessment.
- Communication.
- Incident Investigation and Analysis.
- Emergency Preparedness.
- Safety Procedures.
- Training and Competency.
- Contractor Management.
- Health and Safety Controls.
- Record Management.
- Management of Change
- Environmental Management

The safety audit report that is generated will detail current program strengths and weaknesses and will assist in establishing priorities for effective action to improve the safety program.

9.4 Responsibilities

Employees of Tallman Geological are responsible for ensuring that evaluation strategies such as safety inspections and audits are carried out.

9.5 Standards

OH&S Legislation - Saskatchewan Act – Division 10

Although there are no specific sections requiring evaluation and audits, there is a general requirement that employers must ensure their safety programs are in place and effective in protecting workers from injury.

9.6 Implementation

Tallman Geological is responsible for ensuring that EH&S inspections are completed, and action items implemented to allow for an ongoing monitoring of the company's Health and Safety Management System. Any unsafe actions or conditions found during an inspection will be documented and rectified.

9.7 Monitoring

Tallman Geological will be held responsible for ensuring that any identified issues arising from an inspection or audit are corrected.

9.8 Review/Follow Up

To determine the effectiveness of the Evaluation and Audit strategies described in this section, the company will conduct an annual review of the process.

The Tallman Geological Health and Safety Management System will be reviewed annually as a part of the internal audit protocol.

This page has been left blank intentionally.

10.0 POLICIES AND PROCEDURES

10.1 Purpose

Complete and detailed policies, procedures, practices and rules let all employees and contractors know what is expected of them on company sites. Procedures and rules provide a framework for the implementation of corporate polices and ensure compliance with government legislation.

This section outlines the corporate policies, procedures and practices for Tallman Geological.

The Tallman Geological Health and Safety Management System includes the use of corporate safety policies, safety rules, safe operating procedures, industry recommended practices (IRP's), guidelines, codes of practice and change management practices.

10.2 Corporate Policies

Safety Policies shall be used as the main tool for addressing safety issues and concerns where a corporate view is needed for guidance and consistency. Policies provide supervisory staff with framework and guidance on which to base decisions specific to their own operations, consistent with their level of authority and responsibility.

Corporate safety policies are developed, written and signed by senior management and are to be followed by all personnel including employees, contract operators and contractors.

10.3 Standard Operating Procedures (SOP's)

SOP's will cover specific tasks carried out in a particular area or for a type of work operation. Because of variances in specific work operations (i.e. sweet vs. sour fields), SOP's will be specific to a defined area and/or task and may not be applicable across all operations. SOP's should provide guidance on how to perform the work described safely and will include hazards, hazard control methods, minimum training and regulatory requirements.

Each part of the company should prepare a Job Inventory or similar listing of all the jobs that their employees conduct. Hazardous jobs should be identified by discipline (i.e. maintenance, operators, etc.) and should indicate the jobs which have the greatest potential to injure a member of the workforce. The jobs should be ranked according to the health and safety risks associated with each of them (Reference section 3.0: Hazard Identification and Control). High risk jobs found on the hazardous job inventory should have a standard work procedure and/or code of practice written for them to ensure employees are following the step-by-step instructions and performing the task/job in a healthy and safe manner.

Standard Operating Procedures are prepared for jobs that:

- Are critical (high-risk jobs where incidents have or could result in severe injuries).
- Are new or have been changed.
- Have had new equipment added.
- Require many detailed tasks.
- Involve two or more workers who must perform specific tasks simultaneously; and
- Are done infrequently.

Examples of Types of Work Procedures
(Refer to Appendix E)

- Manual Heavy Lifting
- Driving
- Recover Core Sample
- Handling Hydrochloric Acid
- Handling Trichloroethylene

Industry Recommended Practices (IRP's)

IRP's are a set of best practices compiled by knowledgeable and experienced industry and government personnel and are intended to provide operators with advice on safety issues that are common to the oil and gas upstream industry.

IRP's are available through Energy Safe Canada either in paper or CD format or can be downloaded directly from their website. For more information, refer to the Energy Safe Canada website: www.energysafecanada.com

10.4 Codes of Practice

A Code of Practice is a written document, required by legislation that provides specific information on a particular topic area. The code of practice must include details with respect to the hazard being addressed, the means of controlling the hazard and plans for rescue of a worker in case of an emergency.

A Code of Practice will usually include a procedure and may refer to a Safety Data Sheets. Training and worker awareness are key aspects of the requirements included in a code of practice. All workers who may be exposed to the hazard must be aware of the code of practice and must be trained in the procedures identified for protecting them from the hazard.

Tallman Geological Codes of Practice are found in **Appendix B**.

10.5 Safety Rules

Safety rules have been developed to provide a safe and healthy working environment for all Tallman Geological employees, consultants and contractors. Safety rules apply to work activities at all company locations. Refer to the Safety Rules section.

10.6 Monitoring

Management at all Tallman Geological sites will be held responsible for ensuring that policies, procedures, codes and rules are in place and that all employees and contractors are following them.

Those involved in carrying out the procedures will be monitored to ensure they are following the required practices on a regular basis as a part of regular inspections and audits.

10.7 Review/Follow Up

To determine the effectiveness of the policies, procedures and codes described in this section, the company will conduct an annual review of the documents.

Any changes to legislation, industry practices or company requirements will trigger a review and update of the appropriate policies, procedures and codes.

The Tallman Geological Health and Safety Management System will be reviewed annually as a part of the internal audit protocol.

10.7.1 ENVIRONMENTAL PROTECTION POLICY

We will conduct business in a manner that conserves resources and strives to reduce our environmental footprint. We seek continual improvement in our environmental performance by setting, reviewing and updating environmental goals.

Tallman Geological management commitment to environmental protection is incorporated into its values and business activities through the following principles:

- Managing operations to comply with all applicable laws and regulations and industry standards, emphasizing emission reduction and environmental impacts. Tallman Geological will, in the absence of legislation, apply cost-effective best management practices to promote environmental protection.

- Project planning for drilling, construction, and decommissioning that includes identifying, evaluating and mitigating the environmental impacts to the air, water and soil.
- Effective response to emergencies to protect the public, our workers and the environment.
- Education and training to support a culture that seeks to protect the environment.
- Awareness, leadership and accountability with respect to environmental protection among all our employees and contractors.
- Taking measures to ensure efficient use of materials, resources and energy to reduce and manage waste.

Our employees share in this responsibility and are accountable for the successful implementation of this policy and are empowered to curtail operations, as necessary, to prevent serious environmental impacts.

This page has been left blank intentionally.

11.0 SAFETY RULES

11.1 Cable, Chains, Ropes, Cranes and Hoisting Devices

Cranes and hoisting devices are to be operated only by trained and experienced personnel. The crane operator must work with an experienced signaler.

- All lifting devices must have the rated load capacity marked on the equipment as per manufacturer's specifications.
- If a lifting device is not commercially manufactured it must be certified by an engineer.
- An employer must ensure that a lift calculation is completed for any lift exceeding 75 percent of a crane's rated capacity.
- Mobile cranes equipped with outriggers must be set up with the outriggers on load-bearing floats or pads that are adequate in size, strength, and rigidity.
- Workers should ensure they keep themselves from under loads being hauled by cranes.
- The operator must keep the load as close to the ground as possible. In working near electrical power lines ensure the crane operator keeps a safe distance.
- OH&S regulations require that a log for each lifting device be kept and readily available with equipment information, maintenance, and inspection records.
- Cranes and hoists must be inspected and maintained as per manufacturer recommendations.

Inspect all ropes, chains, hooks and cables before using and do not use if worn, kinked or frayed. Tag defective equipment as out of service and notify your immediate supervisor.

11.2 Communication Equipment

All electronic devices such as cell phones, smart phones, tablets and mobile phones must be intrinsically safe if they are to be used in a potentially explosive environment.

11.3 Entrances, Walkways, Stairs and Ladders

All work areas must always be able to be entered and exited safely. Entrances and egresses, walkways and stairwells must be free of clutter or obstructions that might endanger a worker or restrict their movement.

Handrails on stairways must comply with the applicable provincial OHS legislation for design and construction requirements.

Portable and fixed ladders must comply too construction and manufacturing standards listed in the provincial OHS legislation. Ladders must be secured and positioned as per OHS legislation. Fall protection must be employed when working on a ladder where a person could fall three or more meters from surface.
Please consult with Provincial OHS Legislation for detail on entrances, walkways, stairs and ladders.

11.4 Fall Protection

Fall Protection regulations require employers to prepare written procedures in a Fall Protection Plan. This plan must be in place before work commences on any task where a vertical fall of 3

meters (AB, SK) or more can occur and where workers are not protected by guardrails. In British Columbia OHS regulations require a fall protection system be in place where workers could fall a minimum of 3 meters. British Columbia requires a written Fall Protection Plan when there are no permanent guardrails in place and a fall of more than 7.5 meters is possible.

The plan must also be in place if there is an unusual possibility of injury if a worker vertically falls less than 3 meters, such as falling into or onto a hazardous substance or object or through an opening in a work surface. The plan must include procedures for rescuing workers who have fallen but are unable to rescue themselves. In the event a plan is required, it must be available and reviewed with the workers prior to undertaking the task.

The Fall Protection Plan must specify the following:

- The potential fall hazards at the worksite.
- The fall protection system to be used at the worksite.
- The anchors to be used during the work.
- The clearance distances below the work area, if applicable, have been confirmed as to prevent the worker from striking the ground or an object below the work area.
- The procedures to assemble, maintain, inspect, use, and disassemble the fall protection system(s).
- Rescue procedures to be used if worker falls, is suspended by personal fall arrest system or safety net and needs to be rescued.

The Fall Protection Plan must be updated when conditions affecting fall protection change.

If it is not reasonable for guardrails to be in place, then a worker must use a travel restraint system or other effective means to keep worker from falling.

Instruction of Workers

An employer must ensure that all workers are trained in the safe use of the fall protection system before allowing the worker to work in an area where fall protection must be used. The training must include the following:

- Review of pertinent legislation pertaining to fall protection.
- Understanding of what a fall protection plan is.
- Fall protection methods a worker is required to use.
- Identification of all hazards.
- Assessment and selection of specific anchors that a worker may use.
- Instructions for the use of connecting hardware.
- Information on the effects of a fall on the human body.
- Pre-use inspection.
- Emergency response procedures to be used if necessary.
- Practice in inspecting, fitting, connecting, adjusting, etc.

Fall Protection Equipment

There are many types of fall protection equipment, which are to be determined by the job type and worksite. All protection equipment must meet CSA standards, be inspected prior to use for any damage or malfunction, and kept free from substances and conditions that could contribute to deterioration of the equipment. It should be noted that any fall arrest system equipment that

has stopped a fall should be removed from service after the incident. A professional engineer or manufacturer must certify that the system is safe for continued use. Typical fall arrest equipment includes but is not limited to:

- Full body harness.
- Body belt.
- Lanyard – must be made of wire rope or appropriate material for job and related hazards:
    - If a tool or corrosive agent could sever, abrade, or burn a lanyard, you must ensure that lanyard material is able to withstand hazards.
    - If working around an energized conductor, the employer must ensure that worker uses another effective means of fall protection.
- Shock absorber, shock absorbing lanyard – to be used in fall arrest system and consists of a full body harness and a lanyard equipped with a shock absorber or similar device. When a shock absorber is used, ensure that allowance is made for the potential increase in total fall distance. When a worker is using a personal fall arrest system without a shock absorber the employer must ensure the fall arrest system limits a worker's free fall distance to 1.2 metres.
- The connection components in the system include the following:
    - Carabineers
    - D-rings
    - O-rings
    - Oval rings
    - Self-locking connectors
    - Snap hooks

Travel Restraint Systems

When using a personal travel restraint system, a worker must limit the vertical distance of a fall by:

- Selecting the shortest length of lanyard that will still permit unimpeded performance of the duties.
- Securing the lanyard to an anchor no lower than the worker's shoulder, or if not available to an anchor point that is as high as reasonably practical.
- Using only a single lanyard between worker and anchor, except for electrical danger noted above.
- Another important safety concern in fall arrest systems is limiting the amount of free fall which a worker may experience if a fall occurs. The personal Fall Arrest system must be arranged so that a worker cannot hit the ground or an object below the work area. Furthermore, it must be ensured that the maximum arresting force is in accordance to CSA standards and provincial safety regulations.

Anchors

If a worker is required to use a personal fall arrest system or travel restraint system, the worker must ensure that it is safely secured to an anchor that meets CSA and ANSI standards. Any anchor with multiple attachment points designed to support combinations of suspension lines, tie-back lines and lifelines, is to be certified in writing by a professional engineer.
An employer must ensure that a worker visually inspects anchors prior to attaching a fall protection system. If an anchor is damaged the worker must not reuse the anchor until it is repaired, replaced or re-certified by the manufacturer or a professional engineer.
If a temporary travel restraint anchor point is to be used it must meet the following criteria:

- Have a minimum breaking strength in which the load may be applied of at least 3.5 kilonewtons per worker attached in any direction in which the load may be applied (AB, BC & SK. In Manitoba there is no minimum breaking strength, but the anchor point must be capable of supporting a static force of 8 kilonewtons).
- Be installed, used, and removed according to the manufacturer's specifications or specifications certified by a professional engineer.
- Be permanently marked as being for travel restraint only.
- The anchor must also be removed from use, immediately after the work involving the anchor point is complete or at the time specified by the manufacturer or a professional engineer.
- If a permanent travel restraint anchor is to be used, the following criteria must be met:
- In Alberta, the anchor must have a minimum breaking strength per worker of 16 kilonewtons or two times the maximum arresting force in any direction in which load may be applied (not applicable to anchors installed before July 1, 2009). Saskatchewan have legislation in place that requires a permanent restraint anchor to have an ultimate load capacity of 22.2 kilonewtons (BC = 22 kilonewtons).
- Is installed and used according to the manufacturer's specifications or certified by a professional engineer.
- Is permanently marked as being for travel restraint only.

Fall Arrest Systems

Fall arrest anchors to which a personal fall arrest system is attached must meet the following guidelines, except for temporary horizontal lifeline systems.

- In Alberta, the fall arrest anchors must have an ultimate load capacity of at least 16 kilonewtons per worker attached in any direction in which load may be applied. If structure to which an anchor is attached is not capable of withstanding 16 kilonewtons of force without damage; an anchor designed, installed and used as part of a fall protection system that is capable of withstanding twice the maximum arresting force that the anchor is subject to, may be used. Manitoba and Saskatchewan have legislation in place that requires a permanent restraint anchor to have an ultimate load capacity of 22.2 kilonewtons (BC = 22 kilonewtons).

- The anchor is to be designed, installed, and used in accordance with the manufacturer's specifications, or with specifications certified by a professional engineer.
- The anchor to which a personal fall arrest system is attached is not to be part of an anchor used to support or suspend a platform.

Life Safety Ropes are one of the key components in fall arrest systems. There are several critical points regarding life safety ropes which must be adhered to:

- Vertical lifeline must extend downward to within 1.2 meters of ground level or another safe lower surface (AB & BC). In Saskatchewan and Manitoba, the lower end of the lifeline must extend to ground level or to a safe landing.
- Vertical lifeline must be free of knots or splices except for a stopper knot at its lower end.
- Only one worker is to be attached to a life safety rope at any one time unless the manufacturer's specifications or specifications of a certified engineer allow for the attachment of more than one worker.
- Any safety life rope must be effectively protected to prevent abrasion by sharp or rough edges.
- Be made of appropriate material to the hazard and able to withstand adverse effects.
- Is installed and used in a manner that minimizes the hazards of swinging and limits the swing drop distance to 1.2 metres if a worker falls (SK, AB, & BC).

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 must certify that the system has been properly installed according to the manufacturer's or professional engineer's specifications.

All flexible and horizontal lifeline systems must meet the CSA requirements.

- Rigid and horizontal lifeline systems must be designed, installed, and used in accordance with manufacturers or professional engineers certified specifications.

Control Zones

Control zones are marked areas in which an unguarded edge is present. Control zones may be used only if a worker is working in an area that is more than 2 meters wide when measured from the unguarded edge (AB, SK, BC). Control zones are not to be used to protect workers from falling from a skeletal structure in a work area. However, if the worker will always remain further from the unguarded edge than the width of the control zone; no other fall protection system is needed. Control zones are to be clearly marked with an effective raised warning line or other equally effective method if a worker is working within 2 meters of the control zone. (In Manitoba the control zone must have a warning barrier in place such as a cable or rope).
If work must be done within the control zone, then the use of a travel restraint system or equally effective means of preventing worker from getting to the unguarded edge is necessary. Also, no persons who are not directly required to work in the control zone are permitted inside control zone.

Procedures In Lieu of Fall Protection Equipment

Procedures may be developed in place of fall protection equipment where it is not reasonably practicable to use an approved fall protection system or if the use of procedures in place of fall protection equipment is restricted to the installation or removal of fall protection equipment; roof inspection; emergency repairs, at height transfers between equipment and structures (if allowed by manufacturer's specifications) or in situations where a worker must work on top of a vehicle or load.

When using procedures in place of fall protection equipment a hazard assessment must be completed before work at height begins. Additionally, the procedures to be followed while performing the work must be in writing and available to all workers before the work begins. The work must be carried out in a way that minimizes the number of workers exposed to a fall hazard. The work must be limited to light duty tasks and be completed by a competent worker and does not expose the worker to additional hazards.

Special Procedures

There are also several special protection procedures which must be followed while undertaking certain operations, they are as follows:

- Any worker on a boom elevating work platform, boom-supported aerial device or forklift truck work platform is required to use a personal fall restraint system. The fall arrest system must be connected to an anchor specified by the manufacturer of the work platform. If no anchor is specified by the manufacturer an anchor point must then be certified by a professional engineer that meets CSA requirements.
- When connected to the anchor the lanyard, if reasonably practicable, must be short enough to prevent the worker from being ejected from the work platform or aerial device but long enough to allow the worker to perform their work.
- An employer must ensure that a worker on a scissor lift or an elevating work platform, with similar characteristics uses a travel restraint system consisting of a full body harness and lanyard connected to an anchor specified by the manufacturer and when connected to the anchor, the lanyard, if reasonably practicable, is short enough to prevent the worker falling out of the scissor lift or aerial work platform but is long enough to allow the worker to perform their work.
- Fork mounted work platforms elevated to a height of 3 meters or more above the ground, with any portion of the guardrail system removed, workers on platform must use a travel restraint system. This does not apply however, if the manufacturer's specifications allow a worker to work from the scissor lift or elevating work platform using only its guardrails for fall protection and if the scissor lift or elevated work platform is operating on a firm and level surface.
- If in any of above cases workers movement cannot be adequately restricted in all directions to prevent a fall, then the use of a fall arrest system is mandatory.
- Anyone being raised or lowered in a man basket must use a separate personal fall arrest system that is attached to the personnel basket.
- An employer using a fall protection system consisting of fabric or netting panels must ensure the system is only used to provide protection, is used and installed as per manufacturer's specifications, and a copy of the specifications are available on the worksite.
- Where workers may have to climb onto a vehicle or its load at any location and where it is not reasonably practicable to provide a fall protection system, the employer must take

steps to eliminate or reduce the need for the worker to climb onto the vehicle or load, OR develop and use procedures in place of fall protection equipment in situations in which a worker must work on top of a vehicle or load.
    - If the load is not secured against movement the worker must not climb onto the load.

11.4 Fire & Explosion Prevention

- Adequate ventilation must be provided for all rooms or buildings where gas or light oil products are handled.
- Special vacuum vents and flame arresters should be inspected frequently to determine that they are in good operating condition.
- Vegetation control must be present around tanks, buildings, and wells. A sufficient area must be cleared to prevent the spread of fires.
- Oily or chemical soaked rags must be placed in appropriate, compatible containers with lids.
- Gas leaks must be located only with a gas detector, soap suds or other safe means. If a gas leak is suspected or detected in any confined area, sources of ignition must be shut down immediately.
- The use of plastic pails or containers for flammable products is to be avoided. Use only metal pails with a grounding strap attached.
- All gas regulators are to be vented outside as well as controllers, ensuring controller doors are kept closed.
- Flammable liquids shall be disposed of in a proper and safe manner.
- Iron sulphide or lead sludge shall be removed from vessels etc. as quickly as practical and be kept wet with water until disposed of in a pit or fill site or stored in a covered metal container.
- Rags used to wipe zinc thread lubricant must be kept in a separate covered metal container.
- Static electricity shall be minimized or eliminated to prevent a spark from causing a fire, explosion, or both.
- "Attach Bonding Cable" signs shall be posted at all truck loading / unloading points.

11.5 Fire & Explosion Management

This process involves evaluating of potential risks with respect to fire and explosion hazards; identifying means to effectively manage these potential risks; determining the need for specific control measures to prevent fires and explosions and putting the required control measures in place.

General Fire & Explosion Control Measures

- In hazardous locations, where an explosive atmosphere may exist, employers must ensure they use intrinsically safe equipment (i.e. lighting, cell phones, radios, etc.).

- A person must not enter or work at an area if more than 20% of the lower explosive limit of a flammable or explosive substance is present in the atmosphere.
- A person must not smoke in a work area where a flammable substance is stored, handled, processed, or used.
- A person must not use an open flame in a work area where a flammable substance is stored, handled, processed, or used.
- A person must not mix, clean, or use a flammable or combustible liquid at a temperature at or above its flash point in an open vessel if a potential source of ignition is in the immediate vicinity.
- A person must not use a flammable or combustible liquid at a temperature above its flash point in a washing or cleaning operation unless the equipment is specifically designed and manufactured for the use of the liquid.
- Flammable substances stored or used at a non-hazardous work area must not be in sufficient quantity to produce an explosive atmosphere if inadvertently released.
- Flammable substances should not be stored within 30 metres of an underground shaft or in the immediate vicinity of the air intake of a ventilation supply system, an internal combustion engine or the fire box of a fired heater or furnace.
- Only CSA, NFPA and ULC approved containers can be used to store flammable substances.
- If work requires the contents of metallic or conductive containers to be transferred from one to another, an employer must ensure static electricity is controlled while the contents are being transferred (i.e. utilizing a bonding strap).
- In hazardous locations, employers must ensure that equipment used will not ignite a flammable substance and that static electricity is controlled.
- If a work area is considered hazardous, the boundaries of the hazardous location must be clearly identified to warn workers of the nature of the hazards associated with the presence of the flammable substance.
- Procedures must be in place for hazardous locations that will prevent the inadvertent release of flammable substance or oxygen gas if it can contact a flammable substance.
- When lighting fired heaters and furnaces, face shields and gloves are to be worn.

Portable heaters are to be used only for the service for which it has been approved and adequate ventilation should be maintained to prevent a buildup of exhaust gases. All flammables are to be removed from the immediate area.

For further information concerning Fire & Explosion Hazard Management please refer to the Provincial Acts, Codes and Regulations.

11.6 Housekeeping

Tallman Geological will ensure that healthy and safe working conditions are provided and maintained for all employees. It is the responsibility of employees and contractors to maintain these conditions through good housekeeping.

- All working areas shall be kept clean and free from obstructions. Tools, loose objects, oil, grease, and other materials are tripping and slipping hazards.

- Working areas shall be left clean and tidy at the end of each shift and on completion of work assignments.
- Materials shall not be stored in aisles or overhead.
- Never place equipment and tools on stair treads.
- Oil, paint, or chemically saturated rags must be placed in metal containers with covers.
- Rubbish must be placed in metal containers for waste disposal.
- Pools of oil or water, acids, or caustic, shall be cleaned up immediately. If this is not possible, it should be reported to your supervisor and guarded by a standby person until the condition is corrected.
- Floor or ground openings shall be adequately barricaded.
- Rags are to be used when cleaning up around compressors etc. When purchasing rags, they should be of cotton base. Polyester rags are NOT to be purchased.
- All tools should always be kept clean and in good repair.

11.7 Managing Control of Hazardous Energy (Lock Out/Tag Out)

Before maintenance work, testing or inspection begins on any machinery, equipment or powered mobile equipment, all sources of energy at the location must be isolated by activation of an energy-isolating device. The machinery or equipment must be rendered inoperative in a way that would prevent accidental activation, movement of equipment or otherwise cause damage to a person, property or process. The equipment or machinery must be isolated and secured at the main source of energy or control device.

Pump Jacks

All oil well pump jack installations and dismantling must be supervised by a competent supervisor.

All pump jacks are equipped with rotating weights that are needed to counterbalance the weight of the rod string. A pump jack can start to rotate on its own due to gravity. It is imperative to make it properly secured by one of the following methods after setting the brake.

- The horses head down to the base with a chain and boomer (preferred method).
- A chain threaded through the hole in the brake drum nearest the trunnion and then around the trunnion, or,
- If equipped, the brake pawl on the brake drum should be engaged, or,
- Use heavy timbers under the crank ends to stop downwards movement.

The brake must not be used as the only method for securing the jack.

Before starting up a pump jack, the crank guards and belt cover are to be in place. If there is livestock present, the wellhead should also be guarded.

All pump jack manufacturers supply manuals that give detailed instruction for the safe installation and operation of pump jacks. When installing or dismantling, it is the supervisor's

responsibility to be familiar with the instructions in the appropriate manual. All production operators must be familiar with the operating instructions for the makes of pump jacks they operate.

11.8 Naturally Occurring Radioactive Materials (NORM)

NORM originates in some geological oil and gas formations and is brought to surface in produced water. The amount of radiation able to penetrate processing equipment is generally not large enough to present a health risk. However, scales and sludge that accumulate in the processing equipment may be harmful when the equipment is opened for inspection and repair. Exposure may occur by inhaling or ingesting radioactive dust.

If workers are going to be exposed to scales and sludge, the field supervisor should be consulted to determine if NORM is an issue in the area. If unknown, arrangements for a NORM survey should be made.

11.9 Noise Exposure

Exposure to high sound levels and/or sharp impact sounds for sustained periods can reduce or impair hearing. Noise is a recognized workplace hazard that must be assessed, eliminated or controlled. Area sound level measurements and noise dosimeter tests must be taken at work locations suspected of noise levels exceeding 85 dBA over an 8-hour work period. If a noise hazard is identified, the first step is to engineer out the hazard by substitution, modification, isolation, and/or maintenance. Other administrative or PPE methods to control noise are:

- Applying time limits to spend in hazard areas; and,
- Training workers in the proper use of PPE (disposable ear plugs, re-useable earmuffs, and/or custom-made ear plugs for “noise-exposed workers”).

Audiometric hearing tests at sites with noise issues are to be administered by a certified third party. Testing will establish a baseline for all noise-exposed workers and ongoing testing based on the baseline results will ensure there are no adverse health impacts.

Additionally, all new or renovated worksites, new work processes, or new equipment brought into a workplace must be tested and appropriate controls put in place.

11.10 Overhead Power Lines

Extreme caution must be used when working near overhead power lines. Activities involving such things as high loads, excavation work, crane work or using gin-pole trucks, creates circumstances with the potential for injuries, fire and explosion or property damage. The following outlines requirements when working under or near power lines and is consistent with both regulatory and utility company requirements.

The first two important steps that need to be taken are:

- Notify the utility company and obtain any required crossing agreements.

- Confirm the voltage and maintain the minimum clearance required by the power company.

  Typical clearances are:

Operating Voltage of Overhead Power Lines Between Conductors	Safe Limit of Approach Distance for Persons and Equipment
0 – 750 V Insulated or polyethylene covered conductors (1)	300 mm
0 – 750 V Bare, un-insulated	1.0 m
Above 750 V Insulated conductors (1) (2)	1.0 m
750 V – 40 kV	3.0 m
69 kV, 72 kV	3.5 m
138 kV, 144 kV	4.0 m
230 kV, 260 kV	5.0 m
500 kV	7.0 m

When working under or near overhead power lines, the following precautions must be taken:

- "Danger Overhead Power Line" signs must be in place before work commences. These signs are to be placed at least 7 m on either side of the line when operating equipment either under or near the power line.
- When work is required inside the specific clearance area, it shall be performed with the power lines de-energized. The power lines will be energized by a qualified utility employee.
- If the line cannot be de-energized, the work must be supervised by a qualified utility employee and requires a designated signaler with a communication device.
- Once the safe limit of approach distance has been established the employer must ensure that no work is done, or equipment operated at distances less than the established safe limit of approach distance.
- Work in the vicinity of the power lines must be performed in accordance with the standards established by the appropriate jurisdiction.
- Be aware when working near power lines that certain weather conditions can create electrical charges on nearby facilities and equipment.

11.11 Hand and Power Tools

Tools are to only be used for their intended function and must be maintained in good working condition. Appropriate personal protective equipment must always be worn when using any tool.

Operators are to inspect equipment and verify that it is in safe operating condition before starting work. The power must be disconnected from the tool and any pressure discharged before any adjustments are made.

All guards are always to be properly fitted and in good condition.

Electric tools should be checked for defective cord insulation, poor connections, and defective plugs. If defective, the electric tools should not be used and should be reported to the supervisor. Electric tools must be properly grounded with a three-way plug or double insulated type and CSA approved.

11.12 Welding and Burning

All welding and burning work on locations must be completed by trained contractors with training certification to operate the equipment. Precautions must be in place to ensure that welding is conducted in a safe environment with all sources of combustible materials shut off.

Suitable precautions must be taken against exposure of welding (and other) personnel to excessive ultraviolet radiation, fire, explosion, asphyxiation or exposure to toxic gases, fumes or dust when welding or cutting equipment is used.

A serviceable fire extinguisher is to be immediately available at welding and burning sites.

Before beginning to weld on a live site/hot area:

- Hazard assessment and safe/hot work permit to be completed,
- Appropriate PPE to be worn for welding,
- Area is to be gas checked,
- Fire detectors are to be bypassed.
- When welding at a hazardous location, a standby man with an extinguisher is to be on site.

This page has been intentionally left blank.

12.0 RECORDS MANAGEMENT

12.1 Purpose

Safety forms, records and documentation will be generated by workers, supervisors or managers, according to the requirements outlined throughout this manual.

To demonstrate compliance with the regulations, a copy of relevant safety records must be available to all workers including safety meetings, inspections, investigations, and work procedures.

It is important that a complete record of all safety documents be kept on file for possible review by corporate and regulatory personnel. Files should be established with retrieval capability on a project basis. Any forms not listed in the Retention Times section will be retained for two years.

Upon completion of job or task, the company representative will forward the records to the Head Office or applicable field office for evaluation and retention.

The purposes of the records are to:

- Manage an effective program.
- Comply with legislated standards.
- Allow for consistent measurement against a set of operating parameters.
- Provide documentation in the event of legal proceedings.

12.2 Retention Times

Retention periods have been assigned an identifier that indicates when a retention period can begin.

- **C = Current year** – The retention period begins at the end of the current year in which the record was created.
- **E = Event** - The retention period begins when the event has occurred.
- **S = Superseded** – The retention period begins when the record has been superseded by a newer version; discontinued; or replaced.
- **P = Permanent** – These records must be preserved indefinitely (if the company owns the asset; until the company is dissolved.

Example: E+2 = Two years from time of event.

1. Worksite Hazard Assessments and Inspections

File	Retention
a. General Safety Inspections	E+2 Date from when inspection was signed
b. Safety Equipment Inspections (Fire extinguishers, breathing apparatus)	E+2 Date from when inspection was signed
c. Loss Prevention/Boiler and Machinery Inspections	C+6
d. Process Hazard Analysis Reports	P

2. Meetings and Communications

File	Retention
a. Safety Meeting Minutes	C+4
b. Safe Work Permits (Hot or Cold)	P
c. CSE Permits	E+2
d. Ground Disturbance Permits	E+25 E = Date rec cert issued
e. Risk Management Bulletins	S+0

3. Environment

File	Retention
a. Incident Reports and Spill Clean-up Records	E+10 for major reportable incidents C+3 for minor incidents E = closure of incident

4. Work Procedures

File	Retention
a. Procedures and Codes of Practice	E+1 E = end of life of facility or decommissioning of equipment

5. Worker Health and Safety

File	Retention
a. Workers' Compensation Claim (lost time and medical aid)	E+6 E = Termination of employment and resolution of all financial obligations
b. TDG Declarations	E+2 E = Date DG no longer in transport

c. Site Specific Rules and Regulations	S+1
d. MSDS	S+1

6. Contractor Operations

File	Retention
a. Approved Contractor List	S+0
b. Contractor Evaluations	C+6

7. Emergency Response Planning

File	Retention
ERP, maps, contacts	S+0

8. Training

File	Retention
a. Safety Orientation	P
b. Non-certifiable Safety Training (Fire Fighting, WHMIS, ERP Training)	C+3
c. Certifiable Core Safety Courses (First Aid/CPR, H2S, TDG)	C+3

9. Incident Investigation and Analysis

File	Retention
a. Incident Reports	E+10 for major reportable incidents C+3 for minor incidents E = closure of incident
b. First Aid Reports	C+3

10. Management Communication and Program Auditing

File	Retention
a. Safety Audit Reports	C+6

This page has been intentionally left blank.

APPENDIX A – REFERENCES

1.0 Government Resources – Saskatchewan

Saskatchewan Ministry of the Economy (ECON)
Petroleum & Natural Gas Division
200 - 2101 Scarth Street
Regina, SK
S4P 2H9
Phone: 306-787-2502
Fax: 306-787-2478

Saskatchewan Labor Relations and Workplace Safety
Occupational Health and Safety Division
300 - 1870 Albert Street
Regina, SK
S4P 4W1
Phone: 306-787-4496
Toll Free: 1-800-567-7233

Workers Compensation Board – WorkSafe Saskatchewan
200-1881 Scarth Street
Regina SK
S4P 4L1
Phone: 306-787-4370
Toll-Free: 1-800-667-7590
Toll-Free Fax: 1-888-844-7773

Saskatchewan Ministry of the Economy (ECON)
Wildfire Management Branch
Box 3003
Prince Albert, SK
S6V 6G1
Phone: 306-953-3473
Toll-Free: 1-800-667-9660

2.0 Government Resources – Alberta

Alberta Jobs, Skills, Training and Labour
Occupational Health and Safety
Guinness House, Elveden Centre
600, 727 - 7 Avenue SW
Calgary, AB
T2P 0Z5
Phone: 1-866-415-8690 (OHS Compliance Centre)
Fax: 403- 297-7893

Alberta Energy Regulator (AER)
Calgary Office
Suite 1000, 250 – 5th Street SW
Calgary, Alberta
T2P 0R4
Phone: 403-297-8311
Fax: 403-297-7336
Toll Free: 1-855-297-8311

Alberta Workers Compensation Board
4311 12 Street Northeast
Calgary, Alberta
T2E 4P9
Phone: 403-517-6000
Fax: 1-800-661-1993
Toll-free: 1-866-922-9221

ERSD - Wildfires
9920 – 108 Street
Edmonton, Alberta
T5K 2M4
Phone: 310-3473
Toll-free: 310-0000 (following instruction)

This page has been intentionally left blank.

APPENDIX B – CODES OF PRACTICE

1.0 BENZENE, TOLUENE, ETHYLBENZENE, & XYLENE (BTEX) (COP-001)

1.1 Purpose

BTEX is an acronym that stands for benzene, toluene, ethylbenzene, and xylene. These compounds are some of the Volatile Organic Compounds (VOC) found in some oil and gas processing and petroleum derivatives, which may cause harmful effects to the nervous system of workers if unprotected.

In an effort to ensure that worker risks and exposures to any potential BTEX sources are suitably identified, controlled, and/or eliminated, this code of practice has been developed by Tallman Geological to provide information and required guidance to workers likely to come into contact with fluids or vapours containing BTEX.

1.2 Application

The conditions and requirements of this code of practice shall be rigidly applied and enforced at all facilities and properties owned or operated by Tallman Geological Resources where workers may be exposed to any BTEX source while conducting their work-related activities.

1.3 Hazards

Benzene, and the associated compounds, toluene, ethylbenzene, and xylene, have an anesthetic effect and primarily attack the central nervous system. Prolonged exposure to benzene concentrations of 100 ppm will have adverse consequences.

Benzene is most taken into the body through inhalation of vapour but can be taken in, to a far lesser extent, by absorption through the skin. Inhaled benzene vapours are eliminated from the body by the lungs when the victim is taken into fresh air.

BTEX compounds are normally found as liquids in gas condensates and crude oil streams. If liquid hydrocarbon streams at gas plants show that concentrations of benzene exceed the 0.1% level and are in the range of 0.5% to 1.5%, then extra caution must be taken. Normally, condensate is stored and transported in a closed system of vessels, lines, and pumps, but workers can be exposed when those systems are opened for maintenance. Benzene has also been found as a vapour at the vents of dehydrators at levels of 50 ppm, which can be a concern if there is prolonged exposure to those vapours.

1.4 Exposure Limits

The current Occupational Exposure Limit (OEL) for benzene in British Columbia is 0.5 ppm average for 8 hours, and 2.5 ppm for 15 minutes. In Alberta, the OEL is 0.5 ppm average for 8 hours, and 5 ppm for 15 minutes. There is no OEL information available for Saskatchewan.

Benzene is a skin sensitizer, a known carcinogen, and an ALARA substance meaning that all exposures must be kept as low as reasonably achievable.

1.5 Employer Responsibility

- Surveys will be conducted to identify all streams at facilities where benzene is likely to be present at significant levels.
- All tasks and activities will be studied to determine where exposure to condensate could occur. This will include all routine jobs, such as process surveillance and sampling, as well as occasional tasks, such as routine preventative maintenance and component replacement.
- When tasks are identified where worker exposure could occur, procedures will be developed to control that exposure. This will involve the provision of suitable workplace ventilation and/or use of appropriate personal protective equipment (PPE).
- Workers who may have to work in an area where exposure to Benzene containing streams could occur will be given training in controlling benzene exposure.
- Workers shall attend information sessions on the health hazards associated with Benzene and participate in training with required PPE.

1.6 Worker Responsibility

- Workers must be aware that respiratory protective equipment on its own will not fully protect a worker.
- Workers must be aware of which streams contain benzene and the potential for exposure involved with specified tasks and must follow all written and verbal instructions.
- These responsibilities are incumbent on contractors' employees as well as Company employees.

1.7 Site-Specific Procedures

Each facility shall develop site-specific procedures to cover its own operations.

These procedures must identify streams where benzene is present, list routine operational or maintenance jobs involving those streams, and specify measures to be taken to prevent worker exposure.

The procedures must allow for action at 25% of the OEL or Critical Limit (CL) to ensure that overexposure does not occur.

1.8 Technical Support

To assist facilities in identifying streams that contain benzene and in developing realistic work practices, support should be obtained from the Facilities Engineering Department, who will make arrangements for a hygiene specialist with the specific training and expertise in this field of work to conduct the necessary surveys.

Caution: This program does not represent a complete guideline on the subject area. Consult your supervisor before continuing if there are known and documented areas where exposure is known to occur.

1.9 Related References

- Saskatchewan Occupational Health & Safety Regulation 1996, Part 21: Chemical and Biological Substances Section 302 – 314. BTEX Details.
- CAPP CH4 and VOC Emissions from the Canadian Upstream Oil and Gas Industry Volumes 1, 2, 3, and 4.
- Oil and Gas Occupational Safety and Health Regulations, under Part II of the Canada Labour Code, Part XI: Hazardous Substances.

2.0 CHEMICAL & BIOLOGICAL HAZARDS & HARMFUL SUBSTANCES (COP-002)

2.1 Purpose

This Code of Practice is based on the requirements identified within Alberta OH&S Code is intended to provide guidance and direction to Tallman Geological workers on the steps to be taken in developing, applying, and enforcing the necessary measures for workers exposed to any hazardous substance and to ensure that exposure is kept as low as reasonably practicable and does not exceed occupational exposure limits.

2.2 Application

The conditions of this code of practice shall apply to all facilities and properties owned or operated by the Company. If a worker is unwittingly exposed or overexposed to any potential or real hazardous situation, the occurrence will be immediately brought to the attention of Tallman Geological management, who will coordinate or will delegate the appropriate response.

2.3 Definitions

- Asbestos - includes all forms of asbestos.
- 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.
- Lead - includes inorganics and organic compounds of lead.
- Restricted area - means an area of a work site where there is a reasonable chance that the airborne concentration of asbestos, silica, or lead exceeds the occupational exposure limit under an adopted code.

2.4 General Requirements

- The Company will ensure that a worker’s exposure to any substance listed in the respective provincial chemical substances listing is kept as low as reasonably practicable and does not exceed its occupational exposure limit.
- If no occupational exposure limit is established for a harmful substance present at a work site, the Company will ensure that all reasonably practicable steps are taken to keep each worker’s exposure to that harmful substance as low as reasonably practicable.

- If a worker is exposed to a substance listed in the respective provincial chemical substance listing at a concentration that exceeds its 8-hour occupational exposure limit but is less than its 15-minute occupational exposure limit, the Company will ensure that:
    - Each 15-minute period of exposure is followed by a period of at least 60 minutes during which the airborne concentration of the substance is at or below its 8-hour occupational exposure limit.
    - The worker cannot be subjected to more than 4 of the 15-minute periods of exposure in a continuous 24-hour period; and
    - The 8-hour occupational exposure limit cannot be exceeded.
- 4A worker may not be exposed to a substance listed in the respective provincial chemical substance listing at a concentration exceeding its ceiling limit at any time.
- If no 15-minute occupational exposure limit or ceiling occupational exposure limit is listed for a substance in the respective provincial chemical substance listing, the Company will:
    - Comply with the 8-hour occupational exposure limit, and
    - Ensure that a worker's exposure to that substance does not exceed:
        - Three times the 8-hour occupational exposure limit for more than a total of 30 minutes during a continuous 24-hour period, and 5 times the 8-hour occupational exposure limit, or
        - The concentration that is immediately dangerous to life and health, whichever is lower.

2.5 Exposure to Multiple Substances

The Company will take all reasonably practicable steps to ensure that, if a worker is exposed to more than one substance listed in the respective provincial chemical substance listing during a single work shift and the toxicological effects have similar modes of toxic action.

Exposure during Shifts Longer than Eight Hours

- If a worker is exposed to a substance listed in the respective provincial chemical substance listing during a single work shift that is longer than 8 hours, the Company will ensure that equivalent protection from adverse health effects is achieved by adjusting the 8-hour exposure limit.
- The Company may adjust the 8-hour exposure limit by another method that uses recognized scientific principles that is approved by the provincial OHS governing body.

Review of Exposure Limits

- A person may apply to a provincial OHS governing body to request a review of the occupational exposure limit of a substance.
- An application must be in writing and must include reasons for the review, proposed changes, and information to support the request.

Airborne Concentration Measurements

- If a person measures the airborne concentration of a harmful substance for the purposes of complying with the occupational exposure limits as required by this Code, the person must make the measurement:
    - In accordance with the NIOSH Manual of Analytical Methods, 4th Edition (August 1994), published by the United States Department of Health and Human Services, as amended up to and including the 2nd supplement (January 15, 1998), or
    - Using methods or procedures that are approved by a provincial OHS governing body.
- The Company will record the results of the measurements and keep them for three years from the date on which the measurements were taken.

Potential Worker Exposure

- If a worker may be exposed to a harmful substance at a work site, the Company will identify the health hazards associated with the exposure and assess the worker's exposure.
- The Company will ensure that workers who may be exposed to a harmful substance at a work site:
    - Are informed of the health hazards associated with exposure to that substance.
    - Are informed of measurements made of airborne concentrations of harmful substances at the work site; and
    - Are trained in procedures developed by the employer to minimize the worker's exposure to harmful substances and that they understand the procedures.
- Workers who are provided with training must use the procedures appropriately and apply the training.

Worker Overexposure

- If a worker may be exposed to an airborne concentration that is more than the occupational exposure limit of a substance, the Company will conduct measurements of the concentrations of that substance at the work site.
- If a worker is exposed to more than the occupational exposure limit of a substance, the Company will immediately:
    - Identify the cause of the overexposure.
    - Protect the worker from any further exposure.
    - Control the situation so that no other workers are exposed to the substance at airborne concentrations that are more than the occupational exposure limit, and.
    - Explain to the worker the nature and extent of the overexposure.
- As soon as reasonably practicable, the Company will inform the joint work site health and safety committee (if there is one), in writing, that a worker has been exposed to more than the occupational exposure limit of a substance and advise them of the steps taken to control the overexposure.

2.6 Worker Decontamination

If a worker may be contaminated by a harmful substance at a work site, the Company should provide the facilities (or make the facility available by a third-party service provider), including showers, the worker needs to remove the contamination before the worker leaves the work site.

2.7 Emergency Showers and Eye Wash Equipment

If a worker is present at a work site where chemicals harmful to the eyes or skin are used, the Company will ensure that the worker has immediate access at the work site to emergency showers, eye wash equipment, or other equipment appropriate for the potential level of exposure.

2.8 Prohibited Activities

The company will ensure that workers do not eat, drink, or smoke tobacco in a part of a work site contaminated by a harmful substance.

A worker must not eat, drink, or smoke tobacco in a part of a work site contaminated by a harmful substance.

2.9 Storage of Harmful Substances

The Company will ensure that a harmful substance used or stored at a work site:

- Is clearly identified, or its container is clearly identified, and
- Is used and stored in such a way that the use or storage is not a hazard to workers.

2.10 General Provisions for Asbestos, Silica, and Lead

The Company will:

- Minimize the release of asbestos, silica, and lead into the air as far as reasonably practicable.
- Keep the work site clear of unnecessary accumulations of asbestos, silica, coal dust, and lead, as well as waste materials containing any of these substances, and.
- Ensure that the methods used to decontaminate the work area, workers, equipment, and protective clothing prevent, as much as is reasonably practicable, the generation of airborne asbestos, silica, or lead.

2.11 Restricted Area

*Restricted area means an area of a work site where there is a reasonable chance that the airborne concentration of asbestos, silica, or lead exceeds or may exceed the occupational exposure limit for one or more of them.

- The Company will ensure that only a person authorized by the employer or by law enters a restricted area.
- The Company will post signs that clearly indicate that:
    - Asbestos, silica, or lead is present in the area.
    - Only authorized persons may enter the area; and
    - Eating, drinking, and smoking are prohibited in the area.

- Signs posted must:
    - Be in a conspicuous location at the entrances to and on the periphery of each restricted area, as appropriate, and
    - Remain posted until the area is no longer a restricted area.
- The Company will:
    - Provide workers in a restricted area with protective clothing that protects other clothing worn by the worker from contamination by asbestos, silica, or lead.
    - Ensure that workers' street clothing is not contaminated by asbestos, silica, or lead, and
    - Ensure that a worker does not leave a restricted area until the worker has been decontaminated.
- This does not apply in an emergency if the health or safety of a worker requires the worker to leave a restricted area without being decontaminated.

2.12 Protective Clothing Used in Restricted Areas Containing Asbestos or Lead

- If clothing used in a restricted area containing asbestos or lead is reused and not discarded, the Company will have the clothing laundered in the appropriate manner and at appropriate intervals to ensure that:
    - The clothing is decontaminated, and
    - There is no cross-contamination of other clothing by asbestos or lead.
- The Company will ensure that clothing contaminated with asbestos or lead that is to be laundered prior to being reused is stored and transported in sealed containers.
- Containers must be clearly labelled:
    - To identify the contents.
    - To indicate that the contents are a hazard; and
    - To warn workers that dust from the contents should not be inhaled.

2.13 ASBESTOS

Release of Asbestos

If it is determined that asbestos fibre may be released in a building, the building is in an unsafe condition, and the Company will take all necessary steps to correct the unsafe condition.

Prohibitions Related to Asbestos

The Company will not use materials containing crocidolite asbestos in existing or new buildings. The Company will not apply materials containing asbestos by spraying them.

Asbestos in Air Distribution Systems

The Company will not use asbestos in an air distribution system or equipment in a form in which (or a location where) asbestos fibres could enter the air supply or return air systems.

Asbestos in Buildings to be Demolished

If a building is to be demolished, the Company will ensure that materials with the potential to release asbestos fibres are removed first.

Encapsulation, Enclosure, or Removal of Asbestos

If a building is being altered or renovated, the Company will ensure that materials in the alterations or renovations that could release asbestos fibres are encapsulated, enclosed, or removed.

Notification of a Project

The Company or the designated Contractor who is responsible for removing or abating asbestos or for demolishing or renovating a building or equipment containing asbestos must notify a OHS Director of Inspection of the activity at least 72 hours prior to beginning the activities that may release asbestos fibres.

The Company will not remove or abate asbestos or demolish or renovate a building or equipment containing asbestos if an OHS Director of Inspection has not been notified.

Asbestos Worker Course

The Company will ensure that contract workers who handle asbestos are trained to perform the work safely and carry the original valid certificate of completion before entering a restricted area.

Containment and Labelling of Asbestos Waste

The Company will ensure that asbestos waste is stored, transported, and disposed of in sealed containers that are impervious to asbestos and asbestos waste.

The Company will ensure that containers of asbestos products and asbestos waste are clearly labelled:

- To identify the contents as an asbestos product and carcinogenic, and
- To warn handlers that dust from the contents should not be inhaled.

2.14 Use of Crystalline Silica in Abrasive Blasting

If conducting abrasive blasting or similar activities, the Company will, if reasonably practicable, ensure that crystalline silica is replaced with a less harmful substance.

2.15 Health Assessments

For Workers Exposed to Asbestos, Silica, or Coal Dust

If a worker has been exposed to, or may have been exposed to, asbestos or silica, then the worker must seek medical attention for a complete health assessment as specified in the provincial OH&S Code.

A medical examination arranged must include:

- A comprehensive medical history and physical examination with special attention to the respiratory system.
- Lung-function tests, including forced vital capacity and forced expiratory volume one second; and
- Any further medical investigation that is necessary for the diagnosis of a respiratory disease.

The exposed worker will follow the prescribed treatment and recurring testing as per medical direction given. The records must be retained for the period dictated in the provincial OH&S Code.

2.16 Lead Exposure Control Plan

The Company will develop an exposure control plan for lead if:

- A worker at the work site may be exposed to airborne lead more than its occupational exposure limit for more than 30 days in a year, or
- A worker's exposure to lead at the work site could result in an elevated body burden of lead through any route of entry.

The exposure control plan must include at least the following:

- A statement of purpose and the responsibilities of individuals.
- Methods of hazard identification, assessment, and control.
- Worker education and training.
- Safe work practices if these are required by the hazard assessment under this Code.
- Descriptions of personal and work site hygiene practices and decontamination practices.
- Processes of health monitoring, including biological testing.
- Methods of documentation and record keeping; and
- Procedures for maintenance of the plan, including annual reviews and updating.

A worker must follow the exposure control plan and practice the personal and work site hygiene practices established by the employer to minimize lead exposure at the work site.

2.17 Monitoring

Lead - Air Monitoring

If a worker may be exposed to lead in harmful amounts at a work site, the Company will ensure that air monitoring and surface testing for lead is regularly conducted to confirm that the controls in place are effective.

2.18 Medical Monitoring for Lead

The Company will ensure that blood testing for lead levels is available to a worker if the worker at a work site could reasonably be expected to have an elevated body burden of lead.

The Company will ensure that a worker exposed to lead is informed of the availability of the blood lead test, and the Company will pay for the cost of a blood level test.

An exposed worker may refuse to undergo a blood level test by giving the employer a written statement refusing it.

The Company will not coerce, threaten, or force a worker into refusing part or all the test.

2.18 Related References

- Saskatchewan Occupational Health and Safety Regulations, Part XXI: Chemical and Biological Substances.

3.0 COVID 19 EMERGENCY PREPAREDNESS (COP 003)

Tallman Geological Consulting COVID-19 Emergency Preparedness plan

Due to the ongoing Covid-19 pandemic, Tallman Geological is implementing the following procedures to mitigate the risk to employees, contractors, clients and the general public.

3.1 No employee or sub-contractor will be allowed to visit a rig, well site, or facility while experiencing any symptoms of COVID-19 if they are experiencing any symptoms, or if they have travelled outside their home province, within the previous 14 days. Symptoms of COVID-19 include:

3.1.1 Most common symptoms:

- fever
- dry cough
- tiredness

3.1.2 Less common symptoms:

- aches and pains
- sore throat
- diarrhea
- conjunctivitis
- headache
- loss of taste or smell
- a rash on skin, or discoloration of fingers or toes

3.1.3Serious symptoms:

- difficulty breathing or shortness of breath
- chest pain or pressure
- loss of speech or movement

3.2 If an employee or sub-contractor develops symptoms while on location they are to:

- Immediately inform Tallman management of their symptoms (fever, nausea, dizziness, etc)
- Self-isolate: remove yourself from any possible human contact.
- Create a list of people that you have interacted with in the previous 14 days.

3.3 If such a circumstance were to arise, Tallman Management (at the approval of the client) will immediately dispatch a replacement geologist to relieve the symptomatic individual.

3.4 Prior to leaving the wellsite, assuming he/she is capable, the symptomatic individual is to take all measures possible to sterilize their sleeping quarters, office and any other frequented area prior to departure.

3.4.1 This includes:

- Wiping down all surfaces/appliances/equipment with disinfectant.
- Removing all their personal belongings.
- Washing any bedding/soft surfaces with disinfectant on the hottest setting.
- Upon leaving location the symptomatic individual is to immediately seek medical attention and get tested for COVID-19.
- Upon receipt of results, the symptomatic individual is to notify Tallman management and if necessary, initiate contact tracing.

3.5 While on location all employees/sub-contractors are to adhere to the following guidelines to reduce the risk of exposure to COVID-19:

3.5.1 Only geologists will be allowed in the geological lab. No exceptions.

3.5.2 Prior to crew change, the active geologist will wipe down and sanitize all equipment and surfaces in the lab. This includes:

- counters,
- computers,
- microscopes,
- sinks,
- taps,
- stoves,
- cupboard door/drawer handles,
- keyboards,
- mice,
- computers,
- printers,
- door handles,
- fridge door,
- phones/radios etc.

3.5.3 Thorough hand washing will be required **every** time the geologist enters the lab after exiting for any reason:

- trips to rig floor
- trips to rest room,
- trips to sleeper etc.

3.6 Geologists are to remain in the lab as much as possible.

3.7 Geologists are not to enter the directional/mwd side of the command center.

3.8 Conversations with directional/mwd/company/rig hands can either be done over the phone/radio, or through open doors.

3.9 All geologists are always to keep a 2m distance from other personnel on the job site.

3.10 If 2 geologists are required in the lab, geologists are to wear face covers. (All efforts should be made to limit the amount of time more than 1 geologist is in the lab.)

3.11 Crew changes handover/safety meetings are to be kept brief, concise and to the point.

3.12 While travelling to location, stops are to be kept to a minimum. When entering gas stations/rest stops face coverings are to be worn, touching of surfaces kept to a minimum, and your hands are to be sanitized using an alcohol-based hand sanitizer prior to re-entering your vehicle.

3.13 Trips to town from the rig for food/supplies are to be kept to a minimum. You should pack enough food/groceries from home to last at least a week.

4 CONFINED SPACE ENTRY (COP-004)

4.1 Purpose

Due to the nature of their construction and potential hazards, confined spaces may become immediately dangerous to life and health (IDLH). The purpose of this code of practice is to provide workers with information and an industry accepted format/model necessary to identify a confined space, and the required elements to be incorporated in creating a site-specific procedure for dealing with unique work site confined space entry hazards.

4.2 Application

This code of practice has been designed to provide the required technical information necessary for the development of respective site-specific procedures. The conditions and requirements of this code of practice and resulting site specific procedures shall be rigidly applied and enforced at all facilities and properties owned or operated by Tallman Geological where workers are required to enter any confined space while performing their work-related activities.

4.3 Definition of a Confined Space

A confined space is an enclosed or partially enclosed space not designed or intended for continuous human occupancy with a restricted means of entry or exit that may become hazardous to a worker entering it because:

- Of its design, construction, location, or atmosphere.
- Of the work activities, materials, or substances in it.
- The provision of first aid, evacuation, rescue, or other emergency response service is compromised; or
- Of other hazards relating to it.

As identified within the above definition, confined spaces are not designed for continuous human occupation and generally do not have a convenient means of escape or for rescue of personnel within the space. However, in many cases the spaces are large enough and configured to allow personnel to enter, and to complete inspection and maintenance work.

4.4 Confined Spaces

Confined spaces may include, and are not limited to:

- Towers.
- Elevated platforms and/or structures.
- Trenches (excavations).
- Sumps, piping trenches, and sewer systems.

- Scaffold, vertical ladders, and overhead walkways.
- Process vessels, such as drums, accumulators, boilers, exchangers, etc.
- Storage tanks and diked areas (e.g., tank farms).
- Underground and above ground vaults.
- Buildings with only one access/egress doorway; and
- Areas where access or egress is limited by structures, piping, valves, or other equipment.

4.5 Hazards

The hazards of occupying confined spaces include, but are not limited to:

- Oxygen deficiency or enrichment.
- Asphyxiate gas (e.g., Carbon Monoxide, Ethane, Methane, Helium, and Nitrogen).
- Toxic atmospheres created by poisonous gases, vapours, dusts, or fumes.
- Engulfment, trapped by materials, or internal/external construction components, such as structures, sludge, sediment, ladders, weirs, baffles, or platforms, etc.
- Potential and/or moving machinery.
- Uncontrolled introduction of steam, gas, or produced fluids; and
- Other hazards, such as excessive noise, heat, cold, radiation, and any tripping/falling obstacles.

Goal

The Company will minimize, through engineering and design controls, the number of confined spaces (temporary or permanent) at all its facilities. Procedures will be developed and implemented to accommodate site specific requirements.

This Code of Practice has been developed to assist construction and operations personnel in identifying and assessing the hazards of entering and working in confined spaces.

Cautionary Note

No written document can cover all potential scenarios of confined space entry. Working safely in such environments requires:

- Knowledge and skill in hazard assessment, elimination, and control.
- The application of approved procedures.
- Confined space work experience.
- Certified, confined space pre-entry, entry, and rescue training; and
- Constant vigilance

Recognize that this code of practice serves as a guide only and must be made specific through the development of site-specific procedures, and through the knowledge, skills, and contribution of competent employees, workers, and contractor personnel.

4.6 Responsibilities

Primary Responsibility

It is the responsibility of management to ensure that this code of practice, and any site-specific procedures resulting from this code of practice, is fully understood by respective supervisors, and the conditions applied at all Company owned or operated facilities.

Secondary Responsibility

Responsibilities for implementing the code of practice and applicable site-specific procedures are assigned to departments and to respective Company and contractor personnel. The objective of this code of practice is to ensure that confined space issues are addressed at all stages of the project - from design through to the safe and efficient completion of the work.

Assignment of Responsibilities and Tasks

Those responsible for facilities engineering activities have the responsibility to design out confined spaces, where possible, and to that ensure safeguards are built into those confined spaces that remain.

Operations personnel will coordinate confined space entries and will assess the psychological and personal safety impacts of confined space work on the entrants.
All personnel involved with confined space entry and planned work activities have a responsibility to minimize potential or real hazards involved in confined space entry work and to comply with all confined space entry requirements.

4.7 Training

Training, Certification, and Assessment of Personnel

Prior to entry into confined spaces:

- Only authorized personnel are permitted to enter designated confined spaces. Until such time as they are trained in confined space entry, personnel are not permitted to enter any spaces identified as, or suspected of being, a confined space.
- All construction, operations, and dedicated contractor personnel should be trained in how to identify a confined space. The Confined Space Identification Formula/Chart – Table 1 (located at the end of this COP) should be reviewed with personnel prior to their entry into any work areas at the facilities.
- Designated personnel should be trained in techniques designed to assess a confined space and to determine how hazardous the space may be for entry of personnel. Progressively more stringent confined space entry procedures are required as the degree of risk increases.
- All personnel involved in a confined space entry must be advised of the job scope, attend a pre-entry safety meeting, be provided a site-specific orientation, and review the confined space entry site specific procedure. For complex or multi-vessel entries, it may be prudent to also review the conditions of this code of practice.

Personnel who may be required to enter a confined space must understand and comply with:

- Applicable provincial regulatory requirements.
- Company policies, rules, and guidelines.
- Procedures applicable to entering the confined space (e.g., Safe Work Permit system); and
- Procedures applicable to conducting work in the confined space (e.g., Confined Space Entry Permit).
- Where possible, personnel not possessing any work-related experience must always be supervised while inside a confined space; and
- All employees, workers, and contractor personnel performing confined space entry must have valid certification, endorsed by a recognized Confined Space Entry Training Institution, and shall present their valid certification for examination by supervisor(s) when requested.

Scope of Responsibility and Training Assignments

Applicable responsibilities and any specific training requirements are assigned to the following positions:

- Confined space entry coordinator.
- Safety attendant.
- Site inspector(s).
- Rescue personnel.
- Foreman or contractor supervisor (as applicable); and
- Tradespersons and labourers.

Note: The above positions may be assigned to employees or to contractor personnel.

Confined Space Entry Coordinator

- The minimum standard for the training and experience of the confined space entry coordinator must include Confined Space Pre-entry certification and Confined Space Entry training.
- The CSEC must have supervisory experience and direct experience working in confined spaces under service conditions.

Safety Attendant

- The training and experience required for the position of safety attendant includes Confined Space Pre-Entry certification and familiarity with working in a confined space.
- The safety attendant must be thoroughly familiar with the job scope; all the safety-related equipment available at the immediate work site; applicable emergency and contingency plans; and required safe work practices and procedures.

- Under no circumstances will the designated safety attendant(s) leave their post to enter the confined space, or to carry out any other duty unless they can be immediately relieved by another safety attendant.

Site Inspector(s)

- Site inspectors have specific areas of expertise; however, they must also have an overall knowledge of the scopes of the project and the safety management system in terms of safe work practices and procedures.
- Inspectors must not be responsible for the issuing of Safe Work Permits and Confined Space Entry Permits, or for the authorizing of confined space assessments, entries, or work activities.

Contractor Supervisor

- It is becoming more prevalent within the industry for contractor supervisors to oversee the work once a confined space entry is made. When suitably qualified and experienced, a foreman could be designated as the confined space entry coordinator.
- If a contract supervisor is likely to be designated, the decision maker must consider the complexity of the work in the confined space, and the supervisor's ability to respond in an emergency.

Tradespersons/Laborers

- Tradespersons and labourers will generally carry out the work in the confined space. Initially, workers may have to be closely supervised to confirm their capabilities to carry out the planned work in a safe and efficient manner. Those tradespersons/labourers must be *competent workers.
- *Competent means adequately qualified; suitably trained; and sufficiently experienced.

Contractor Personnel

Experienced contractor personnel may be designated to occupy any of the following positions. Remember, only competent and certified contractors should be considered for these positions:

- Confined space entry coordinator.
- Safety attendant; or
- Rescue team member.

4.8 Strategies and Planning for Confined Space Entry

Important responsibilities and tasks must be delegated to and completed by qualified owner and contractor personnel. In the management of confined space entry work, the following activities must be addressed in all confined space activities planning:

- Design out confined spaces wherever possible.
- Build in safeguards for permanent confined spaces.
- Create a detailed confined space inventory for the facility.
- Develop written site-specific procedures for all confined space entry activities.
- Train all personnel in confined space identification.
- Train designated personnel in confined space assessment (to determine level of risk).
- Conduct site assessments to confirm completeness of the confined space inventory.
- Determine rescue requirements based on site specific configurations of individual confined spaces.
- Train and certify selected personnel in confined space rescue.
- Apply the Safe Work Permit and Confined Space Entry Permit system to all confined space assessments/entries.
- Determine what blinding, blanking, and lockout/tag out requirements are required.
- Designate a confined space entry coordinator.
- Determine safeguards and or control functions for each specific confined space entry.
- Identify safeguards for other site-specific hazards; and
- Create and maintain a personnel confined space entry log.

4.9 Emergency Response

After determining the applicable strategies that will be implemented for the respective confined space entry, a critical component of any complicated or hazardous work process is the identification of mitigation control measures necessary to affect an efficient emergency response. While every confined space may have its own unique hazards or attributes to contend with, which may require a site-specific plan, in general and for the purpose of meeting respective provincial legislative requirements, the following conditions must be considered in the emergency response plan:

- It is the employer's responsibility to ensure that a worker does not enter or remain in a confined space unless an effective rescue can be carried out.
- A worker must not enter or stay in a confined space unless an effective rescue can be carried out.
- As a condition of the aforementioned, the Company will ensure that the respective response plan includes the emergency procedures to be followed if there is an accident or other emergency, including the procedures in place to evacuate the confined space immediately:
- When an alarm is activated.
- If the concentration of oxygen inside the confined space drops below 19.5 percent by volume or exceeds 23.0 percent by volume; or

- If there is a significant change in the amount of hazardous substances inside the confined space.

4.10 Confined Space Planning and Entry
Design out Confined Spaces

Confined space issues must be addressed at the project design phase. Decisions made here can eliminate the confined space altogether. For example:

- Buildings or process equipment can be constructed and/or located (in relation to one another) to provide for unrestricted access/egress by personnel and to promote free movement and dissipation of potential accumulations of explosive or toxic gases.

Safeguards for Permanent Confined Spaces

- When confined spaces cannot be eliminated, safeguards (e.g., warning signs and barriers to restrict entry) must be included with the specifications. Consideration must also be given to other issues including ventilation, atmospheric monitoring, and access/egress devices where confined space entries will be frequent.

4.11 Detailed Confined Space Inventory

- Confined spaces that have been identified at the design stage form the basis of the confined space inventory program. Clearly, the inventory must be expanded as the facility or process is developed.
- The inventory will locate, list, and identify by a unique number all known confined spaces on a site. Details relevant to a planned entry including the size of the space, the size of the entrance, the number of points of entry, internal configuration, known content, and potential content must be recorded for each permanent confined space.
- This information facilitates the classification of the confined space. Classification into low, medium, or high hazard categories enables progressively more stringent safeguards to be applied as the risks increase.
- Non-permanent confined spaces (e.g., a heated and boarded area during construction or maintenance), though not inventoried, can be classified as to type. A general set of safeguards will be specified and contained in the facility's confined space entry procedure manual.

4.12 Written Procedures Development

- A set of written safeguards must be provided in the project specifications for each type of confined space at the facility.
- The operations supervisors and/or the EH&S representative will create appropriate safeguarding (due diligence) documentation. Operations management will ensure safeguards are implemented. Management will also require that construction and operations personnel will make safeguards site-specific to each confined space.

4.13 Confined Space Identification Training

- Owner and contractor personnel will be trained to identify confined spaces and will avoid entering such spaces until they are trained and certified for entry into confined spaces.
- Confined Spaces on site should be discussed with all employees and contractors on site and review the contents of this code of practice.
- Designated operations personnel shall inform personnel prior to authorizing confined space entry personnel any access to work sites.

Confined Space Assessment Training

- Once identified, a confined space is subject to further assessment to determine the degree of hazards.
- Specialized training is required to perform this assessment. This training will be provided through the Company or its designated representative.
- Contractors who conduct confined space assessments must be trained to the same standard.

Training and Certification for Confined Space Entry (CSE)

- All personnel who may be expected or required to work in a confined space must receive confined space entry training and on-the-job training from competent personnel experienced in confined space entries and, where appropriate, safe operating practices for the specific confined space.
- Once it is determined the workers can work safely and effectively in confined spaces, they will receive a confined space entry certification which is valid for a period of three (3) years in accordance with industry best practice.
- Personnel who do not routinely enter confined spaces may require periodic competency review and on-site training through the period of their three (3) year certifications.

Other Training and Certification

- All employees and dedicated contractors will be trained in the Company safety program. The owner expects employees in all positions to be involved in the controlled evolution of their program based on industry best practices and continuous improvement.
- This involvement includes active roles in the development and implementation of codes of practice, safe work practices, and standard operating procedures.

4.14 Site Assessments

- The project or facility supervisor shall determine the frequency for site assessments which are intended to not only identify hazards, but also to determine whether adequate safeguards are being applied.
- The composition of the assessment team is determined at the pre-job meeting and must consider the qualifications and experience of personnel delegated to conduct site assessments.
- This assessment will confirm the required confined space entry safeguards, which will protect personnel and establish standards for how confined spaces (permanent or otherwise) will be marked or identified throughout the term of the project or operational life.

Note: Some permanent confined spaces may become evident only at the time of construction and may not have been identified on the inventory created at the pre-construction stage. These must be added to the inventory along with appropriate drawings, configurations, and observations made during site assessments.

4.15 Rescue Requirements

- A rescue plan must be formulated by the Confined Space Entry Coordinator and take into consideration the unique configuration of each confined space, available site personnel, proximity to off-site resources, and any other unique considerations.
- On sites where entries are frequent, access/egress hardware and extrication hardware should be considered for installation or for full time deployment on site.
- The importance of a safe means of entry and exit from the respective confined space cannot be over emphasized. While safe entry and exit may most impact upon the worker, it is the Company's ultimate responsibility to ensure that this condition is provided for.

4.16 Safe Work & Confined Space Entry Permit Application Requirements

- Work permit requirements are detailed at pre-job meetings and via protocols established within the work permit system. Permit issuers must be well trained in this Code of Practice and in the proper issuance of Safe Work Permits and Confined Space Entry Permits. They must also be familiar with the requirements for designating confined space entry coordinators, safety attendants, rescue teams, and other related personnel.
- Until a confined space is fully assessed as to its potential hazards, it will be treated as hazardous and will require all available safeguards, including specified personal protective equipment, breathing apparatus, atmospheric monitoring equipment, use of a safety attendant, and rescue personnel equipped with applicable extraction equipment.
- Re-entry to confined spaces after work breaks or periods of absence must not be considered automatic. Atmospheric testing must be repeated, and the presence and proper operation of all safeguards must be confirmed prior to re-entry and resumption of the planned work.

Note: Only authorized personnel can attach or remove lockout and tag out devices. Personnel must at no time attempt to remove, bypass, or disable these devices.
For specific details pertaining to lockout/tag out requirements, refer to Lockout/Tag Out and applicable provincial regulations.

4.18 Safeguards - Confined Space Entry Coordinator

- When it is first determined that a confined space will be entered for work purposes, the site supervisor or contractor foreman will designate a confined space entry coordinator and together they will determine the appropriate safeguards for that confined space entry.
- The Coordinator as previously explained must be a trained and suitable experienced employee or contractor employee.

Safeguards Determination for a Specific Confined Space Entry

Safeguards for atmospheric hazards include, but are not limited to:

- Purging the space to remove toxic, combustible, or other contamination.
- Physically isolating the space (blinding or blanking) from further contaminants; and
- Ventilating the space to achieve and maintain an O2 level sufficient to allow work to be conducted without the use of breathing apparatus and to avoid a build-up of toxic or combustible contaminants.

Other Safeguards

Other safeguards include personal protective equipment (PPE) and may include, but are not limited to:

- One self-contained breathing apparatus (SCBA) for each person who may be involved in support activities or in a rescue of personnel within the confined space.
- Supplied air breathing apparatus (SABA) for personnel working within the confined space when:
    - A clean breathing atmosphere cannot always be ensured when personnel are in the confined space, or
    - The work is of extended duration and SABA is specified to allow greater mobility to personnel in cramped work areas within the confined space; and
    - Headwear, body wear, hand wear, footwear specific to the nature or content of the confined space.

Safeguards Identification for Site Specific Hazards

- Safe Work Permit to be completed to identify and control site specific hazards. The permit shall be completed by designated, experienced personnel with the objective of identifying additional hazards relating to the planned work.

- Effective completion and sharing of the safe work permit/hazard assessment and confined space entry permit allows for review and commitment by all personnel engaged in the planned confined space entry and work.
- It is the contractor's responsibility to inform the Company supervisor and the confined space entry coordinator of the hazardous nature of any products, processes, or equipment which the contractor brings to the site which may be used within the confined space.

Safeguard Application

- The site supervisor or contractor foreman must be familiar with the Company's safety management system, the Safe Work Permit and Confined Space Entry Permit system and their application to confined space entries and planned work.
- As previously explained, a qualified safety attendant will be stationed at the point of entry (e.g., active vessel manway) into the confined space always when personnel are within the space.
- Other assistance may include atmospheric monitoring personnel, rescue personnel, and other support personnel where required by:
    - The complexity of the confined space.
    - The nature of the work being conducted within the space; and
- The degree of hazards related to the entry and to the planned work.

4.19 Confined Space Entry Log/History

A Confined Space Entry Log shall be created and maintained for all spaces identified in the Confined Space Inventory.

Atmospheric monitoring and testing data will be recorded at appropriate time intervals in the log and/or applicable permits. These records will document the effectiveness of ventilation and other safeguards applied to reduce exposures to below occupational exposure limits (OELs). In accordance with provincial regulatory requirements, these documents are to be retained for a three (3) year period.

Additional details about the confined space may only become apparent after the initial entry of assessment personnel. Unusual internal configurations, problems associated with temperature, noise, toxic vapours, residual products, and other factors can affect subsequent entries.

4.20 Work Plan Revision

The experience of working in a confined space is unique and challenging. A short debriefing session conducted with all personnel involved in the confined space entry and in conducting the work should be held after the specific task is completed. The discussion could include a revision of work procedures used with the intent of making future entries and the completion of planned work safer and more efficient.

After each confined space entry, a debriefing will be held with all involved personnel to discuss:

- Procedures used and work activities that went according to plan.
- Procedures that could have been conducted in a safer or more efficient manner; and
- Minutes of this debriefing are recorded in the Confined Space Entry Log. The log should be reviewed prior to subsequent entries.

  The log and/or the inventory will stipulate any unique design configurations of confined spaces contained within:

- Complex vertical vessels and tanks, and
- Complex horizontal vessels, compartments, or spaces.

4.21 Confined Space Classifications:

Level 1 - Low Hazard: A Level 1 - Low Hazard confined space is one in which there does not exist and there is not likely to exist:

- An explosive or toxic gas, vapour, dust, or fumes, or
- An O2 content of less than 19.5% or greater than 23% by volume.

Level 2 - Medium Hazard: A Level 2 - Medium Hazard confined space is one in which there has existed or was likely to have existed:

- An explosive or toxic gas, vapour, dust, or fumes, or
- An O2 content of less than 19.5% or greater than 23% by volume, which has been purged, ventilated, and otherwise made safe for human occupancy.

Level 3 - High Hazard: A Level 3 - High Hazard confined space is one in which there NOW EXISTS or is likely to exist:

- An explosive or toxic gas, vapour, dust, or fumes, or
- An O2 content of less than 19.5% or greater than 23% by volume and which cannot be ventilated to provide and maintain an atmosphere safe for human occupancy.
- Confined Space Entry and other Safe Work Permits, where required, are to be issued for all classes of confined space.

4.22 Pre-Entry to a Confined Space

A Confined Space Entry Coordinator (CSE) will be appointed whenever an entry is planned. The coordinator will create a site-specific plan based on this Code of Practice in consultation with all participants including the project supervisor and all workers designated to enter the confined space.

A Safe Work Permit must be completed to address all hazards related to the planned work in the confined space.

For permanent confined spaces, the CSE Coordinator will examine:

- The Confined Space Inventory for information about the confined space, and
- The Confined Space Entry Log for additional data derived from debriefing sessions conducted after previous entries into the space (if applicable).

For temporary confined spaces, the CSE Coordinator will examine the actual site and must determine:

- Access to the space and how it will impact work or rescue of personnel.
- Nearby processes that could impact the confined space while personnel are in the confined space; and
- Other relevant details of the confined space that can be determined without entering the space.

4.23 Confined Space Scouting Entry

If enough data cannot be gathered from the hazard assessment, then a scouting entry will be made which takes the maximum precautions as identified for high hazard spaces and as noted below.

High Hazard Confined Spaces Entry

Entry into high hazard confined spaces will require:

- Completion of a Confined Space Entry Permit.
- Completion of a Safe Work Permit that details the findings of the preceding assessment; and

Entry Requirements

All entries into high hazard spaces require:

- A safety attendant stationed at the point(s) of access to the space.
- A suitable means of communication when normal verbal communication between the entrants and the safety attendant (positioned at the entry point to the confined space) is not possible.
- Appropriate atmospheric monitoring equipment.
- Intrinsically safe (low voltage) flashlights.
- Personal protective equipment expected for the hazards (e.g., self-contained breathing apparatus where contaminant levels cannot be reduced or O2 sufficiency cannot be achieved); and
- Rescue and extrication personnel and equipment.

4.24 Safeguards

Safeguards will be implemented to control atmospheric hazards of toxicity, combustibility, and O2 enrichment or deficiency. These include, but are not limited to:

- Purging.
- Isolating the space from further contamination though owner approved procedures. (See Safety Rules 10.8 Managing Control of Hazardous Energy Lockout/Tag Out) and related procedures).
- Removing sources of contamination (e.g., sludge, liquids); and
- Ventilating the space to maintain an O2 sufficient atmosphere free of toxic contaminants and combustible vapours.

4.25 Additional Precautions

Additional precautions include:

- A safety attendant must be stationed at the point of entry to the confined space.
- The atmosphere within the confined space must be continuously monitored for the presence of toxic or combustible vapours or reductions in O2 level as physical entry may result in fugitive emissions caused by agitation of fluids or scale.
- Provisions for continual communications with personnel within the confined space.
- Extraction harness and lanyard must be worn by the entrants unless they can be reached from one or more entry points; and
- Respiratory protection equipment relevant to any residual hazard must be worn and emergency egress respiratory equipment must be available for emergency donning and exit from the confined space.
    - The potential hazards of the work carried out in the confined space (e.g., hot work, work with pressurized fluids, or pyrophoric materials) must be detailed in the Safe Work Permit and may require additional personnel who are trained in reducing or eliminating particular hazards.
    - The Confined Space Entry Permit and Safe Work Permit must be posted at the entry point to the confined space. Provisions may have to be made for such postings (e.g., a sandwich board). This should be part of any routine signage and barricade kit.

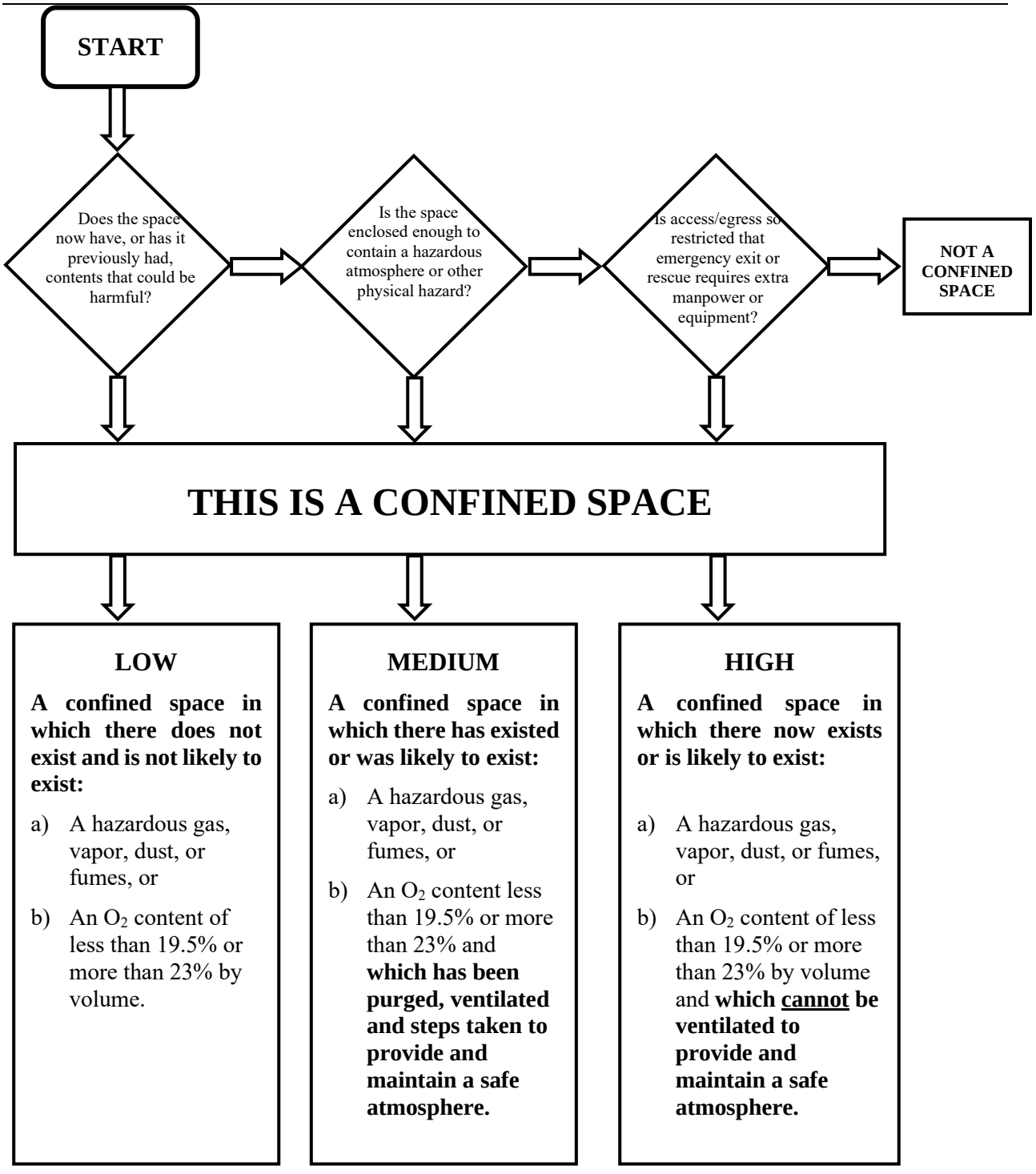
4.26 Exit and Debriefing

- After exiting the confined space, a debriefing session will be held with all personnel (including site supervisors) who participated in the confined space entry and in carrying out the planned work. Debriefing notes will then be entered into the Confined Space Entry Log.

4.27 Related References

- Saskatchewan Occupational Health and Safety Regulation 1996, Part XVIII: Confined Space Entry, Part XXVII Controlled Products (WHMIS)

- Oil and Gas Occupational Safety and Health Regulations, under Part II of the Canada Labour Code, Part XII: Confined Spaces; Part XIII: Safety Materials, Equipment, Devices, and Clothing, Respiratory Protection,
- Saskatchewan Labour OH&S Information.
- CCOHS Confined Space Program.
- Princeton University: Confined Space Entry.
- U.S. Department of Labour, Confined Spaces.


START
Does the space now have, or has it previously had, contents that could be harmful?
Is the space enclosed enough to contain a hazardous atmosphere or other physical hazard?
Is access/egress so restricted that emergency exit or rescue requires extra manpower or equipment?
NOT A CONFINED SPACE
THIS IS A CONFINED SPACE
LOW
A confined space in which there does not exist and is not likely to exist:
a) A hazardous gas, vapor, dust, or fumes, or
b) An O_2 content of less than 19.5% or more than 23% by volume.
MEDIUM
A confined space in which there has existed or was likely to exist:
a) A hazardous gas, vapor, dust, or fumes, or
b) An O_2 content less than 19.5% or more than 23% and which has been purged, ventilated and steps taken to provide and maintain a safe atmosphere.
HIGH
A confined space in which there now exists or is likely to exist:
a) A hazardous gas, vapor, dust, or fumes, or
b) An O_2 content of less than 19.5% or more than 23% by volume and which cannot be ventilated to provide and maintain a safe atmosphere.

5 FIRE RETARDANT WORK WEAR (COP-005)

5.1 Purpose

This code and practice apply to all Tallman Geological employees and contractors.

The fire-retardant work wear program is designed to emphasize and enhance employee safety, through ensuring the use of appropriate personal protective work wear in potentially hazardous areas, by reducing the risk of thermal burns.

5.2 General Provisions

Fire retardant work wear must not be used as a substitute for proper job planning or minimizing potential hazards.

The outermost garments must be fire retardant and shall have reflective striping (refer to the PPE section as per section 3.5.5.7 of the Tallman Geological Health and Safety Manual. Tallman Geological requires that all employees, contractors wear fire retardant coveralls with reflective striping while working for Tallman Geological

5.3 Use of Protective Work Wear

The protective work wear should provide a good functional fit for maximum protection and comfort on the job. Users should be aware that the fit of the garment could have a direct influence on how much protection can be provided by a garment. For example, a garment that is too loose or too tight will not offer maximum FR protection.

The protective work wear must be worn properly. The zipper must be worn closed and sleeves and cuffs worn down and secured. For maximum protection collar should be worn closed.

Single layer protective garments are more effective when worn over an additional layer of clothing.

Protective neck, head, hand, and foot coverings should be worn if the occupational hazard warrants their use.
Certain synthetics or synthetic blends worn as undergarments may not be appropriate for use under fire retardant work wear, as the transferred heat from a flash fire may cause them to melt. Undergarments with melt retardant properties are required (e.g. cotton, wool).

Applications where disposable garments could be used are to protect regular FR from extremely dirty jobs (e.g., tank cleaning, equipment tear down), or other fabric degrading jobs (e.g., painting). **Warning:** Disposable garments shall only be worn over fire retardant garments and must meet the flame-retardant test and be approved as outlined in**CGSB 155.20. They are not intended to be the primary garment for workers.

Note: The outer most primary garment in any protective ensemble shall not be made of any fabric that burns, melts, or drips. The use of a garment that burns, melts, or drips that is worn over a Fire-Retardant garment may contribute to the severity of a burn injury.

5.4 Where FRW is Required

Fire retardant work wear shall be worn whenever an employee enters a Tallman Geological worksite where there is foreseeable exposure for a hydrocarbon flash fire or an explosion from combustible gas or natural gas liquids is present

These foreseeable hazardous areas include but are not limited to:

- Service rig operations
- Gas plants
- Pipelines, pump station
- Oil batteries
- Wellheads
- Construction sites
- Drilling rig operations

If, following a documented site-specific hazard assessment, by the Tallman Geological representative or designate in charge, it is determined that there is no foreseeable exposure to an accidental release of explosive, or flammable mixtures, (e.g. an office setting or while driving company vehicles), these areas or tasks of exception where fire retardant work wear is not required, will be exempt.

5.5 Fire Retardant Work Wear Material Selection and Ordering

Tallman Geological identifies the preferred material and garment selection for its workers, through contractual agreements with a garment manufacturer.

All fire-retardant work wear selected for use must meet or exceed the requirements established in the Canadian General Standards Board, **CGSB 155.20, “Work wear for Protection Against Hydrocarbon Flash Fire”.

Fire Retardant Coverall Provisions

Tallman Geological will provide employees with fire retardant coveralls, including quantity of garments per year, frequency of replacement and approval process for purchasing.

5.6 Employee Responsibilities

Maintains assigned fire-retardant work wear in a proper manner, e.g. sleeves rolled down, to ensure maximum protection.

5.7 Employee Training

As an important part of using personal protective equipment employees must be familiar with:

- When FR is required to be worn
- The proper wearing of the garments
- The potential hazards associated with the non-use of non-fire-retardant work wear in a flash fire situation.

FR protection will be covered in new employee/supervisor orientation and documented through the attendance record.

5.8 Contractor and Visitor Requirements

Contractors are always required to wear fire retardant work wear and under the same conditions as that of Tallman Geological staff.

Fire retardant work wear worn by contractors must meet or exceed the requirements of **CGSB 155.20, or as outlined in local area site-specific requirements for contractors.

5.9 Maintenance of Protective Work Wear

To ensure proper repair and maximum garment longevity, repairs, and approved alterations to fire retardant work wear will be handled on a local basis, as required, at company expense.

Repairs should only be made with components, which comply with the original garment's specifications and construction.

Unless otherwise decided by local management, the responsibility for keeping issued FR reasonably clean and free of flammable or combustible materials that could degrade the fire-retardant characteristics of the clothing will remain with the employee.

All cleaning must be done in accordance with manufacturer's specifications.**4.10 Static Electricity**

The major static hazard is the body which can store a large static charge. It is imperative that in situations where static electricity poses a significant hazard that the body be grounded regardless of the type of clothing worn. Clothing can generate static electricity of enough energy to ignite combustible atmospheres. It is important to minimize the buildup of static electricity on work wear to prevent the clothing from becoming a source of ignition for a flash fire.

Workers should be grounded before entering a high-risk area to minimize the possibility of static build-up and discharge.

Workers should also avoid removing any garments while in the high-risk area. Friction of one fabric against another may contribute to the generation of electrical charge.

One approach to reduce the static build up on garments is to use an antistatic treatment during laundering.

Coveralls should be hung to dry. Drying in an electric dryer should be avoided to minimize static build up.

5.11 Related References

- Canadian General Standards Board, CGSB 155.20, “Work Wear for Protection against Hydrocarbon Flash Fire”.
- Canadian General Standards Board, CGSB 155.21, “Recommended Practices for the Provision and Use of Work Wear for Protection Against Flash Fire”.
- Canadian Association of Petroleum Producers (CAPP), Guide for the Selection and Use of Flame-Resistant Work wear.

6.0 HYDROGEN SULPHIDE (H2S) (COP-006)

6.1 Overview

Hydrogen sulphide (H_2S), a common petroleum contaminant in the upstream oil and gas industry, may be present as a gas or be dissolved in produced water, crude oil, or natural gas condensate. Hydrocarbons contaminated with H_2S are commonly called “sour”.

For health and safety purposes, all facilities processing hydrocarbons contaminated with any concentration of H_2S should be evaluated for potential hazards to the workers.

In addition to this Code of Practice, reference should be made to the Alberta Energy Regulator Directive 71 (Emergency Preparedness and Response Requirements for the Upstream Petroleum Industry).

6.2 Physical Characteristics

The physical characteristics of hydrogen sulphide (H_2S) are as follows:

- H2S is a naturally occurring gas found in a variety of geological formations. It may also be referred to as sour gas, acid gas, stink damp, or sulphurated hydrogen.
- H2S is colourless, heavier than air, and extremely toxic. It burns with a blue/green flame to produce Sulphur Dioxide (SO2), which is a very irritating gas with a pungent odour.
- H2S may form an explosive mixture with air. The lower limit of flammability is 4.0% H2S, and the upper limit is 44.0%, by volume; and
- In small concentrations, H2S has a rotten egg smell and causes eye and throat irritations. It can deaden your sense of smell and, at higher concentrations, can cause death.
- Never rely upon smell to indicate the presence of H2S; low levels of H2S will negatively affect your smell sensors. Exposure to 20 ppm may irritate the eyes, nose, and throat. H2S is extremely toxic at exceptionally low concentrations. Concentrations of H2S greater than 100 ppm are immediately dangerous to life and health (IDLH).

Warning: Serious over-exposure to H_2S results in instantaneous collapse. There is absolutely no time to react. Do not think you can sense symptoms coming on and evacuate in time.

6.3 Acute Health Hazards of H2S

H_2S is extremely toxic at exceptionally low concentrations. Concentrations of H_2S greater than 100 ppm are immediately dangerous to life and health (IDLH). Exposure to 20 ppm may irritate the eyes, nose, and throat.

H_2S has a rotten egg odour. This odour cannot be used to detect H_2S because people rapidly lose their sense of smell when H_2S levels are above 100 ppm.

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

Table 1 – Toxic Effects of Inhalation of H_2S

% By Volume	Concentration (ppm)	Health Effect
.0001	1	Can be smelled.
.0010	10	• Alberta Occupational Exposure Limit (OEL). Allowable for 8 hours of exposure. • British Columbia Ceiling Exposure Limit (EL). An unprotected worker may not be exposed above this concentration. • Respiratory protection is required beyond this level.
.0015	15	• Alberta Ceiling OEL. An unprotected worker may not be exposed above this concentration.
.002 - .005	20 - 50	• Severe eye irritation. Nose, throat, and lung irritation. Loss of appetite.
.01 - .15	100 - 150	• Serious complication may result • Severe eye, nose, throat, and lung irritation • Loss of smell • Exposure duration of 8 hours or more may be fatal.
.02 - .03	200 - 300	• Headaches and drowsiness • Prolonged exposures of several hours may cause lungs to fill with fluid.
.02 - .03	300 - 500	• May cause unconsciousness and death in 1 to 4 hours.
.05 - .07	500 - 700	• Knockdown may be fatal within 1 hour at this level of exposure.
>0.7	>700	• Immediate knockdown may be fatal.

6.4 Long-Term Health Hazards

Human studies have found no direct link between exposure to low H_2S concentrations (less than 10 ppm) and long-term health effects. One animal study has found some evidence of neurological symptoms, such as memory loss, after long term exposure to 50 ppm H_2S, but this finding has not been confirmed by other studies.

6.5 Physical Properties

Pure H2S is slightly heavier than air and may collect in low spots under certain conditions. H2S and hydrocarbon mixtures may act differently than pure H2S. When H2S is mixed with some light hydrocarbons, such as natural gas liquids (NGL), the mixture is much heavier than air.

It is almost impossible to predict where H_2S may concentrate in outdoor areas or buildings. It is important to monitor for H_2S in all locations in outdoor areas or buildings.

H2S is soluble in water and hydrocarbons. Any H2S gas that comes out of solution will collect in the head spaces of tanks, pipes, and vessels containing sour liquids, liquid sulphur, and solid sulphur. It is possible for H2S to collect in confined areas in concentrations exceeding those found in the liquid.

For example, the head space of a tank may exceed the occupational exposure limit (OEL) even though it may contain oil with as little as 0.5 ppm H2S.
In some conditions, the H2S concentrations in the head space may exceed those concentrations IDLH. Hazardous concentrations of H2S may also be released by large spills or releases of sour liquids. Pure H2S is flammable at 40,000 ppm or higher.

6.6 Occupational Exposure Limits

Occupational Exposure Limit values (OELs) are set by provincial regulators as limits for concentrations of hazardous compounds in workplace air. OELs for hazardous substances represent an important tool for risk assessment and management. As well, OELs provide valuable information for occupational safety and health activities concerning hazardous substances.

Occupational exposure limits can apply to marketed products and to waste and by-products from production processes. They set limits to protect against health effects, but do not address safety issues, such as flammable concentrations.

Note: OELs are subject to change. Current limits should be verified with provincial regulators.

Table 2 – Occupational Exposure Limits of H_2S

	8 Hour OEL	15 Minute OEL	Ceiling
Alberta	10 ppm	15 ppm	15 ppm
British Columbia	-	-	10 ppm
Saskatchewan	14 ppm	21 ppm	-

8 Hour OEL: Occupational limit based on an 8-hour exposure period.

15 Minute OEL: Occupational limit based on a 15-minute exposure period. No more than four (4) such 15-minute exposure periods during an 8-hour shift. Each 15-minute exposure must be followed by at least 60 minutes during which the airborne concentration is at or below the 8-hour OEL.

Ceiling: The maximum concentration to which a worker can be exposed to H_2S instantaneously.

If a period of work exceeds eight hours, an employer must ensure that equivalent protection from adverse health effects is achieved by adjusting the 8 hour OEL using the following formulas or alternative methods using recognized scientific principles approved by a Director of Occupational Hygiene.

Daily Adjustments of Occupational Exposure Limits:
Adjusted Exposure Limit = 8-hour OEL x Daily Reduction Factor:
Where Daily Reduction Factor $\left\{ \frac{8}{} \left[x \frac{24 - h}{16} \right] \right\}$, and
h = hours worked per day

Example: If a typical workday is 12 hours, and the worker will be exposed to H_2S for the full 12 hours consecutively, the following formula would be used to calculate the adjusted OEL for that worker on that day:

Daily Reduction Factor = $\left\{ \frac{8}{12} \left[x \frac{24 - 12}{16} \right] \right\}$

Therefore: Daily Reduction Factor = .6666667 x .75
Therefore: Daily Reduction Factor = .5
Therefore: 12 Hour OEL for H_2S = 10 ppm x .5 = 5 ppm
Therefore: OEL of H_2S for a 12-hour exposure = 5 ppm

6.7 Detection

H2S detection should be conducted using chemical sensing instruments or detector tubes. Operators should be aware of the potential limitations and interference associated with the use of the equipment.

Note: When an H2S reading is taken using any of the following methods, a record of the results shall be maintained for at least three years from the date of measurement.

6.7.1 Gas Detectors

Chemical sensing gas detectors are the superior and recommended method of H_2S monitoring. There are three types of monitors: personal, portable, and remote/fixed. All provide accurate and reliable readings only if properly calibrated and maintained. They should be calibrated at least once per month, or as recommended by the manufacturer.

Bump testing with the appropriate calibration gas should be performed upon activation of the unit and prior to each work shift. Documentation of bump testing and calibration is mandatory.

Personal monitors are carried by workers. They provide continuous readings and should alarm if H_2S levels exceed 10 ppm or any other pre-determined concentration.

Portable monitors are like personal monitors but are used for specific purposes, such as maintenance or turnarounds, etc.

Remote/fixed monitors are permanently fixed devices suitable for installations like gas plants or oil batteries. Remote/fixed monitors also continuously monitor H_2S concentrations and sound an alarm at 10 ppm H_2S.

All gas detectors have a response time from when the monitor is placed in an H_2S atmosphere to when the sensor reaches the actual reading. Some sensors may take up to one minute to respond

to H_2S concentrations of 10 ppm. However, in atmospheres with exceedingly high levels of H_2S, the response time to the alarm concentration (10 ppm) will be much quicker (within seconds).

6.7.2 Detector Tubes

Detector tubes detect and provide a rough measure of H_2S concentrations. Detector tubes do not provide continuous monitoring or sound an alarm. Readings may take up to one minute. Air supplied respirators must be worn during the use of detector tubes when determining the workplace H_2S concentrations if it is possible for H_2S levels to be greater than the ceiling limit. Respirators may not be required when detector tubes are used in low risk situations, such as sampling process streams. Every situation should be evaluated to determine the possibility of exceeding the OEL.

6.8 Monitoring

Any area or facility processing hydrocarbons contaminated with any concentration of H2S should be monitored and evaluated for the potential of worker overexposure to H2S as outlined in the appropriate regulations.

If concentrations of H2S greater than 10 ppm are encountered, then workers must communicate the H2S hazard to other workers in the area and conduct further testing to determine the hazard level. All additional testing shall be conducted while wearing approved breathing apparatus, either self-contained breathing apparatus (SCBA) or supplied air breathing apparatus (SABA).
All monitoring equipment shall be set to alarm initially at 10 ppm H2S. Consideration shall also be given to supplement remote sensing devices with personal monitors if the hazard is deemed excessive (e.g., levels of H2S exceeding 10 ppm).

Personal and portable hand-held monitors shall be maintained and calibrated by qualified personnel according to manufacturer's recommendations as a minimum guide. Remote/fixed monitors shall be tested and calibrated according to the manufacturer's recommendations, or at least quarterly, whichever is the least.

6.9 Personal Protective Equipment (PPE)

Respiratory protection is required when entering areas where:

- Sour equipment integrity has been compromised.
- H2S concentrations are above 10 ppm in British Columbia, 15 ppm in Alberta and Saskatchewan.
- There is any indication of equipment failure or product leak; and/or
- Entry is into a confined space containing sour liquids.

Respiratory protection shall be:

- A full-face, positive pressure SCBA, or
- A full-face, positive pressure SABA equipped with a 5-minute escape air bottle.

Other personal protective equipment required includes:

- Chemical eye goggles due to vapour that may cause eye irritation.
- Backup personnel are required when entering an IDLH atmosphere greater than 100 ppm H2S. Backup personnel should be fully trained in rescue and shall be properly equipped with proper air-breathing apparatus.

6.10 H2S Training

All applicable personnel shall meet the following H2S requirements:

- All personnel, prior to entering an area where H2S is known to be present or may reasonably be expected to be encountered, shall receive orientation on the site rules, procedures, and relevant rescue and evacuation procedure information.
- All personnel working in areas where they may be exposed to H2S must have H2S Alive (or similar industry accepted standard) certification and must maintain the certification in a valid condition.
- Each worker will have an annual facemask fit test to ensure the standard supplied facemask fits and seals properly. If the standard supplied facemask does not fit properly and seal, then a personalized unit must be supplied for the worker. Documentation of the fit testing is required; and
- All such personnel shall practice, at least quarterly, the donning and wearing of self-contained breathing apparatus (SCBA) equipment and should be comfortable in their ability to do this quickly and efficiently.

6.11 Hydrogen Sulfide (H2S) Safety

All personnel shall meet the following safety requirements:

- Before anyone enters a confined area known to contain or to be suspected of containing H2S gas (e.g., vessels, trenches, sumps, and tanks), trained personnel must test the atmosphere for H2S. Respiratory protective equipment must be worn and a rescue attendant must be present during testing;
- All personnel who may be required to work in an H2S environment shall be clean-shaven before starting work. Operating personnel must not have any facial hair that would interfere with a positive seal of the breathing apparatus facemask.
- Whenever work is conducted in an H2S designated area, a continuous H2S gas monitor must be present and functioning.
- H2S gas detection devices (permanently or temporarily installed), must be capable of emitting an audible and visible alarm when H2S gas concentrations exceed 10 ppm. Permanently installed monitoring and detection devices are the preferred method; and
- Whenever workers must enter an area where H2S concentrations are known to be 15 ppm (ceiling OEL) (Alberta) or more, they must do so in pairs using the buddy system in case an incident should occur. Appropriate SCBA or SABA respiratory equipment must be worn.

6.12 Warning Signs

All personnel shall proceed as follows:

- Areas known or suspected to contain H2S gas must have warning signs posted.
- Where practical, H2S designated areas must have a wind direction device readily visible on site.

- In emergencies, areas exposed to H2S gas concentrations exceeding 15 ppm (Alberta) must be evacuated and guarded to prevent unauthorized entry; and
- A person's smell response to various concentrations of H2S is summarized as follows (ppm = parts per million):

  - 0.02 ppm Minimal perceptible odour.
  - 0.77 ppm Faint but readily perceptible odour.
  - 4.60 ppm Easily detectable moderate odour; and
  - 20.00 ppm Strong, unpleasant odour; breathing apparatus must be worn.

6.13 Pre-Job Planning

Before starting a job, the following should be reviewed with personnel on the site and recorded in a Safe Work Permit:

- H2S hazards and where they may be found.
- Monitoring requirements (continuous or specified intervals).
- Backup personnel requirements.
- Safety watch requirements.
- Muster point location.
- Review of Site-Specific Emergency Response Plan.
- Respirator requirements and locations.
- Alarms and emergency notification procedures; and
- Communication procedures.

6.14 Site Specific Procedures

Site Specific Procedures must be developed which are relevant to the specific H2S hazards, the level of risks encountered, the equipment available, and the competency of the workers. All the above procedure elements must be included in the area site-specific procedure dealing with H2S.

6.15 H2S Rescue

There are seven steps to take during an H2S emergency.

Step 1 - Evacuate: Get to a safe area immediately. Move upwind if release is downwind of you. Move crosswind if release is upwind of you. Move to higher ground if possible.

Step 2 – Alarm: Call for help (e.g., “Man down!”), sound bell, horn, whistle, or call by radio.

Step 3 – Assess: Do a head count. Consider other hazards.

Step 4 – Protect: Put on breathing apparatus before attempting rescue.

Note: Refer to Respiratory Protective Equipment Code of Practice for further details.

Step 5 – Rescue: Remove victim to a safe area.

Step 6 – First Aid: Follow the standard firs aid protocol at the work site.

Step 7 - Get Medical Aid: Arrange transport of victim to medical aid. Provide information to Emergency Medical Services (EMS).

6.16 First Aid

First aid can only begin after rescue personnel have left the H2S area, sounded the alarm, donned breathing apparatus, and brought the victim to a safe area.

Artificial respiration or rescue breathing are quick and effective techniques that should be used until qualified medical help arrives on the scene.

Note: Only qualified personnel may use mechanical resuscitators or oxygen.

In the case of slight or minor exposure where the worker is not totally unconscious and wants to return to work after a short rest period, it is recommended that duty be postponed until the following day. Reflexes may not have returned to normal and the worker could be exposed to further injury from other work hazards. It is vitally important that anyone working around or near Hydrogen Sulphide (H2S) has a good working knowledge of artificial respiration.

Reminder: Once a casualty is removed to a fresh air zone and normal respiration is restored rapid recovery may be expected.

Patients should be kept under continual medical observation until such time as the attending physician releases them from custody and declares them fit to return to work.

6.17 H2S Equipment

All personnel shall meet the following H2S requirements:

- Personnel working in areas where H2S is encountered must have an adequate number of serviceable SCBA units available on site. Typically, this is one per person. Users should be comfortable in their ability to don this equipment quickly and under stressful conditions.
- SCBA units dedicated for response purposes must be maintained at maximum pressure for the specific type. SCBA units intended for training are not subject to this condition. However, training units will be appropriately identified and located to ensure that they are not inadvertently confused with the units intended for emergency use.
- Keep emergency equipment clean and in good operating condition.

- The facemask, regulator, bottles, and suspension assembly are to be inspected and cleaned (as per the manufacturer's specifications) after each use, and prior to storage. Only qualified personnel are to carry out any servicing requirements on breathing apparatus.

Do not use petroleum-based material for cleaning or softening the mask. It will lead to the edge of the mask stiffening and cracking and will eventually lead to the loss of an effective seal; and Facemasks should be replaced when they lose flexibility.

6.18 Related References

- Saskatchewan Occupational Health and Safety Regulations 1996, Part VI: General Health Requirements; Part VII: PPE; Part XXI: Chemical and Biological Substances; Part XXII: WHMIS; Part XXV: Fire and Explosion Hazards; Part XXIX: Oil and Gas.
- American Conference of Governmental Industrial Hygienists (ACGIH).
- CAPP Occupational Safety of Hydrogen Sulphide (H2S).

7.0 RELEASE OF HARMFUL SUBSTANCES (COP-007)

7.1 Purpose

This code of practice is intended to provide guidance to Tallman Geological workers on the steps to be taken to prevent an uncontrolled release of a harmful substance and, should such an event occur, the steps to mitigate its harmful effects.

7.2 Application

The conditions of this code of practice shall apply to all facilities and properties owned or operated by the Company. In the event an uncontrolled discharge is discovered by a worker, the discharge will immediately be brought to the attention of Tallman Geological management who will coordinate or delegate the appropriate response.

7.3 Definitions

Controlled Releases

- Controlled releases are anticipated and planned for. Systems and procedures shall be in place to control the amount released so that workers and the public are not at risk.
- Many controlled releases must also be reported or pre-approved. Inquire with the Tallman Geological Environment team for further information in this regard.

Uncontrolled Releases

- The most common type of uncontrolled release operations personnel can be exposed to, are spills and gas releases, but may also include fires, explosions, and well blowouts where the environmental effects could potentially be harmful to workers, residents, property, or the environment.
- Uncontrolled releases will be contained and recovered as soon as reasonably practicable. The discharge site will be cleaned up and restored to its previous condition within a reasonable time frame and/or as conditions permit.
- Emergency response to an environmental occurrence, such as an oil spill, draws on people's experience, training, and judgment. No program of this type can dictate responses or contingencies for every type of situation or circumstance; however, Tallman Geological is committed to being prepared for emergencies and to responding quickly and effectively to emergency situations.

7.4 Preventing a Release

The Company will take every reasonable and practicable approach in its efforts to prevent an uncontrolled release of a harmful substance. When designing, constructing, operating, and remediating client sites, workers will take the necessary measures to ensure the following:

The decommissioning of facilities will comply with appropriate codes and accepted industry practices.

- When building new facilities, maintaining, or upgrading existing facilities, or conducting site remediation, suitable materials will be selected to contain the hazardous substances under the conditions of temperature, pressure, and corrosiveness normally expected.
- Equipment will be appropriately maintained and not allowed to continue to operate outside of prescribed tolerances.
- Equipment will be operated within the design limits as required by the manufacturer.
- Workers will demonstrate competence in maintenance procedures and operation of equipment, prior to working independently.
- Transport vehicles must not be left unattended while loading. Appropriate spill containment equipment (e.g., drip pans) and procedures must be developed and implemented wherever these activities are performed.
- Chemicals used in the treatment of raw resources, or for the treatment of process water and surface run-off, should be stored in suitable containers and location.
- Contaminated surface run-off must be contained, sampled, treated, and disposed of in accordance with regulatory requirements.

7.5 Related References

- Occupational Health & Safety Act, Regulation 1996, Saskatchewan Labour, Section 302 to 314, Part 21: Chemical and Biological Substances.
- Oil and Gas Occupational Safety and Health Regulations, under Part II of the Canada Labour Code, Part XI: Hazardous Substances.
- Oil and Gas Conservation Act Part 6: Regulations.

8.0 METHANOL (COP-008)

8.1 Purpose

Within the oil and gas industry, Methanol is primarily used to protect natural gas pipelines against the formation of gas hydrates at low temperatures, as an absorption agent in gas scrubbers, in drilling mud, and in refrigeration systems. However, there are many other applications. Some of these additional uses are identified below for the interest of the reader:

- Used in chemical synthesis, predominantly in the production of formaldehyde, methyl t-butyl ether, acetic acid, dimethyl terephthalate, and methyl methacrylate.
- Used as a feedstock for other organic compounds, such as dimethyl ether, methylamines, methyl halides, and glycol methyl ethers.
- Used as an ingredient in products such as shellacs, paints, varnishes, paint thinners, automotive windshield washer fluids, and as a denaturant for ethanol; and
- Used in the production of gasoline.

8.2 Application

Due to the varied applications, conditions, and opportunity for exposure to methanol, Tallman Geological has developed a written COP that will provide the necessary guidance and direction to workers who may be exposed to Methanol or Methanol-contaminated materials while conducting work-related activities at Company workplaces.

It is recognized that where any of our suppliers have implemented procedures, practices, or site specific procedures to manage exposure to Methanol, the supplier's standard shall be considered to have precedence over Tallman Geological COP, as long as the client's standard provides for an equal or better standard of care.

8.3 Practice

In keeping with the requirements of provincial OH&S Regulation and Code, it is the Company's responsibility to ensure that all workers with the potential for exposure are made aware of the presence of Methanol at any work site.

It is the Company's responsibility to ensure that workers are provided with the appropriate safety orientation, that the scope of the task has been adequately discussed, and that a Safe Work Permit covering the activity has been completed, reviewed, and signed by both the Company representative and the applicable service provider.

It is the Company's responsibility to ensure that an MSDS, applicable to the controlled product(s), is available at the work site.

It is the Company's responsibility to ensure that its contractors, independent consultants, and workers have received the necessary training (WHMIS) in accordance with applicable provincial legislated requirements.

It is the Company's responsibility to ensure that work site supervisors can review the Methanol Code of Practice (COP) and to apply the conditions where required.

Refer to supplier SDS for product information including handling, health effects and emergency response.

8.4 Related References

- Alberta Occupational Health and Safety Code, Part 4: Chemical Hazards, Biological Hazards, and Harmful Substances, Section 26(1) Codes of Practice.
- British Columbia Occupational Health and Safety Regulation, Part 5: Chemical and Biological Substances and Part 6: Substance Specific Requirements.
- Saskatchewan Occupational Health and Safety Regulations 1996, Part XXI: Chemical and Biological Substances, Part XXII: Controlled Products – WHMIS.

9.0 RESPIRATORY PROTECTIVE EQUIPMENT (COP-009)

9.1 Purpose

This code of practice contains information and guidance on the selection and use of respiratory protective equipment used at Company facilities.

The appropriate manufacturer's specifications for the specific brand name and type of equipment must be read, understood, and complied with by all potential users.

9.2 Application

This code of practice is applicable to all work sites that:

- May be subject to airborne contaminants in amounts that exceed government occupational exposure limits, and
- May contain toxic or oxygen deficient atmospheres.

9.3 Types of Respiratory Protective Equipment

Respiratory protection is required when the breathing atmosphere:

- Is deficient in oxygen.
- Is toxic due to the presence of toxic or hazardous substances; and
- Has a respiratory irritant.

Breathing protection is required equipment for all facilities and is generally available in the form of supplied air respirators (SCBA, SABA) and as air purifying (cartridge type) respirators.

Supplied Air Respirator Systems (SCBA, SABA)

- Self-Contained Breathing Apparatus (SCBA) or Supplied Air Breathing Apparatus (SABA) must be used in work tasks or in emergency situations when the breathing atmosphere is made toxic by any substance including, but not limited to:
- Presence of hydrocarbon gas.
- H2S concentrations above 10 ppm in British Columbia, 15 ppm in Alberta and Saskatchewan; or
- When the concentration of oxygen is less than 19.5% by volume.
- SCBAs differ from SABAs in that SCBA users carry their air supply within a cylinder worn on the back, whereas SABA users draw air from a remote source of breathing air via a breathing air hose line.
- Both systems use the same style of full facepiece breathing air mask; however, the SABA system utilizes a reserve or separate source of air (contained within a small 5 minute escape bottle, worn on the hip) to allow egress from the area.
- This egress air supply is intended for evacuation only and shall never be used as a source of breathing air for work purposes. Regardless, the emergency escape equipment, or as previously referred to in this COP as "egress air supply", shall meet all applicable standards governing SCBA.

- In the positive pressure mode, these systems must offer a minimum Respiratory Protection Factor (RPF) of 10,000 (they must protect the wearer when concentrations of toxic materials reach 10,000 times the Occupational Exposure Limit - OEL).
- When purchasing a system for operations that have H2S levels more than 200,000 ppm (20%), the system must offer a protection factor equal to or better than the maximum concentration of H2S in the pipes and vessels.

Note: Cartridge type respirators must not be worn in atmospheres containing H2S in concentrations above 10 parts per million (ppm).

- For H2S work more than 10 ppm, a full facepiece SCBA or SABA must always be worn when in the affected area. The presence of H2S will be monitored by designated personnel at regular intervals while the work is being completed.
- If it is required to rent respiratory protection equipment (SCBA or SABA), the following points must be considered:
- In-house inspection should be completed and documented.
- The equipment must be NIOSH approved.
- The air supplied must meet CSA Standards.
- Maintenance records for the equipment being provided should be available on request from the supplier or provider of the rental equipment.
- The equipment should be in a hygienically clean condition; and
- Workers must be competent in the use of the equipment.

Note: Training records must confirm that workers have been trained in the use of the type of equipment (SCBA, SABA) that is provided.

Air Purifying Respirators

Air purifying respirators work on the principle of removing toxic contaminants from the air but cannot be used:

- When the breathing atmosphere contains less than 19.5% oxygen, and
- When the toxicity of the breathing space exceeds the protection factor of the respirator.
- Note: The selection of a respirator is critical to protect the worker adequately.
- The following decision chart shall be used when selecting respiratory protection equipment.
- Breathing air respirator cartridges shall be carefully selected to address the current atmospheric hazards of the workplace.
- It is critical that the correct respirator cartridge be selected for the atmospheric hazard present or suspected. Not all cartridges are effective for all situations.

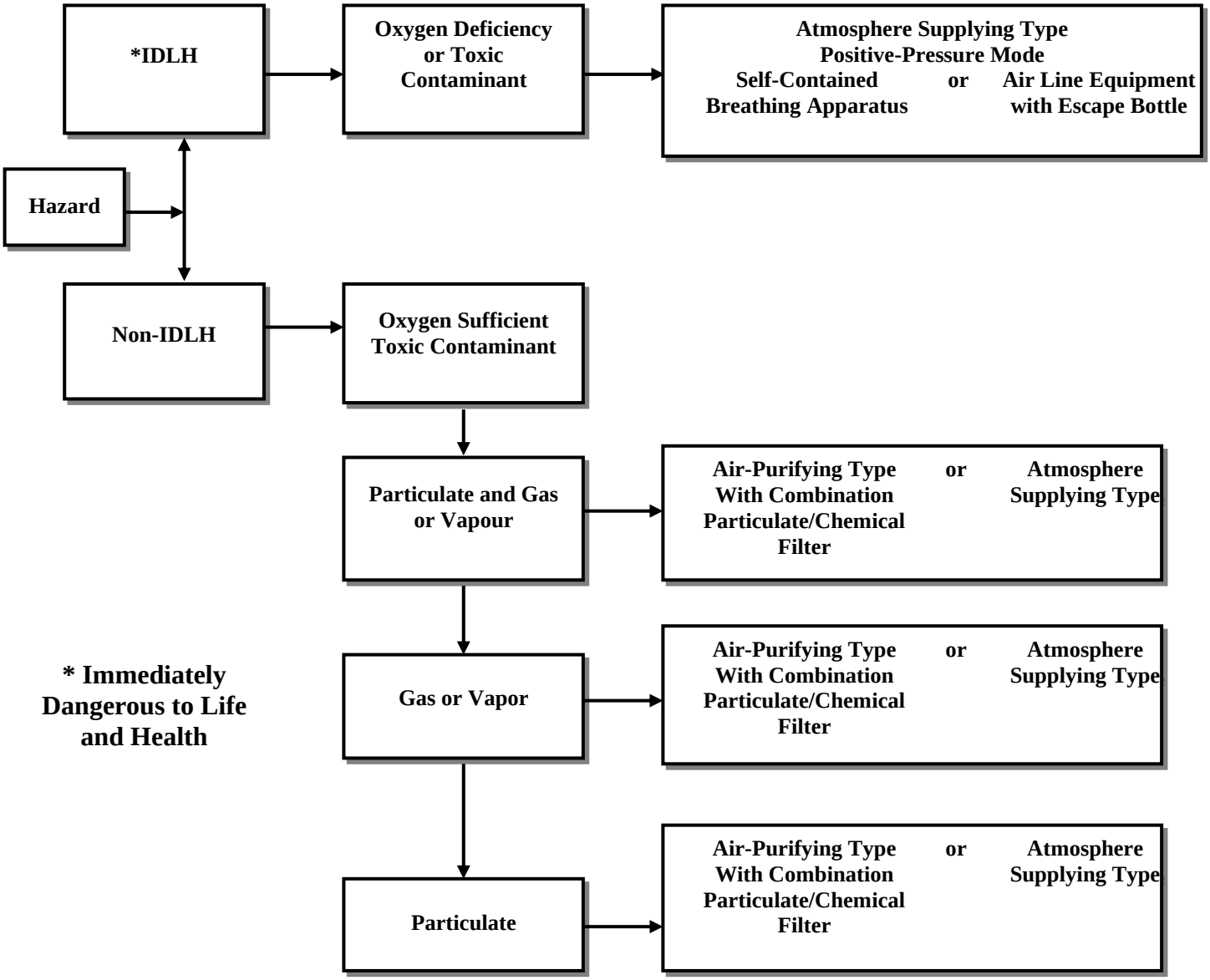
The following is the colour-coding standard for air purifying respirator cartridges:

Black	• Organic vapours (hydrocarbons).
White	• Acid gases (which combined with water in human tissue will form an acid (e.g., Sulphur Dioxide).

Green	• Ammonia, Methylamine.
Yellow	• Organic vapours and acid gases.
Purple	• HEPA (High Efficiency Particulate Air) filter for Asbestos.

Air purifying respirators shall not be used for protection against Hydrogen Sulfide because the sense of smell is destroyed and cannot be relied-upon to determine the presence, concentration of, and hazard potential of H2S.

9.4 Chart 1 - Respiratory Equipment Selection



9.5 Respiratory Hazards

Refer to the following table for common respiratory hazards that may be present at the facilities. Selecting the appropriate respirator depends on the type, toxicity, and particle size of the particulate matter.

Table 1 – Respiratory Hazards

Hazards	Minimum Respiratory Protection Required
Oxygen deficiency 19.5% O_2 or less	SCBA, positive pressure, 30 minutes with alarms or SABA with auxiliary air supply
Hydrogen Sulphide (greater than 15 ppm)	SCBA, positive pressure, full face, 30 minutes with alarms or SABA with auxiliary air supply
Natural Gas - sweet (Methane, Ethane, Propane above 1,000 ppm)	SCBA, positive pressure, 30 minutes with alarms or SABA with auxiliary air supply
Other hydrocarbons	See MSDS for hydrocarbon and type of respirators
Paint vapours	Half face mask with Organic Vapour cartridge with a mechanical prefilter
Solvent vapours (OEL to 10 x OEL) (10 x 50 x OEL) (above 50 x OEL)	Check MSDS for occupational exposure limit (OEL) – half face mask with organic vapour cartridge – full face mask with organic vapour cartridge – SCBA or SABA
Asbestos	Half face mask with High Efficiency Particulate Air (HEPA) filter
Welding fumes	Half face mask with filter capable of removing metal fumes
Nuisance dusts	NIOSH/MHSA approved particulate filter
Sand blasting	SABA with egress bottle
Note: This is not a complete list of all the respiratory hazards that may be encountered at a work site. See the appropriate MSDS for the correct respiratory protection.	

Contaminant Warning

- Atmospheric testing shall be carried out on all work areas suspected of containing a toxic, contaminated, or oxygen deficient atmosphere.
- All atmospheric (gas testing) shall be conducted by trained, designated personnel using approved equipment and procedures.

Toxicity Limits

- Cartridge type respirators may only be used for protection against substances not exceeding the protection factor of the mask and where there is a minimum oxygen concentration of 19.5% by volume.

- If the concentration of the contaminant in the breathing atmosphere is not greater than 10 times the occupational exposure limit for that substance, a half facepiece cartridge type mask may be used.
- For concentrations greater than 10 and less than 100 times the acceptable exposure limit, a full facepiece cartridge type respirator may be used.
- For concentrations above 100 and less than 1,000 times the acceptable exposure limit, a positive pressure airline supplied full facepiece respirator shall be used.
- For concentrations above 1,000 and less than 10,000 times the acceptable exposure limit:
    - A positive pressure airline supplied-air respirator with an egress bottle attached, or
    - A SCBA unit shall be used.

- At any time, if any suspected atmospheric contaminant may affect the eyes, a full facepiece respirator shall be used. This respirator may be a SCBA unit, SABA unit or a cartridge type respirator, dependent upon the atmospheric contaminants present in the workplace.

Maintenance, Cleaning, and Storage

9.6 Cleaning

Immediately after use, respiratory protective equipment must be cleaned, the facepiece sanitized, and the equipment stored in the proper location.
Note: Users require training in the use, proper maintenance, and storage of respiratory protective equipment.

- Cleaning of masks/facepieces should be performed in the following manner:
- Towelettes/cleaning wipes - these are individually packaged, alcohol-free cleaning wipes available from local safety equipment supplier, and
- Household liquid dishwashing solution in conjunction with warm water is an acceptable cleaning method. Drying can be accomplished with the use of a soft cloth or paper towel.

This task is typically performed by the user of the equipment.

9.7 Inspection and Maintenance Program

- Equipment that is not used on a regular basis must be inspected by a trained worker, at least monthly.
- The inspector must ensure the equipment is in satisfactory working condition, clean, and in its proper location.
- Written documentation of this inspection must be retained at the work site and must include the name of the inspector and the date that the inspection was performed.
- The supervisor in charge of the work location must designate a trained worker to complete these inspections. All equipment must be field inspected by the user prior to donning equipment and exposure to the hazard.

9.8 Records

Administrative records shall be maintained on:

- Each SCBA or SABA unit.
- Each breathing air cylinder (bottle).
- Any repair work, modification, or inspection of respiratory protective equipment.
- Training of workers in the proper use and maintenance of respiratory protective equipment; and
- Respirator facepiece fit testing of workers.

9.9 Breathing Air Quality and Cylinder Integrity

To ensure the breathing air quality conforms to CSA Standard CAN3-Z180.1 - M85, "Compressed Breathing Air and Systems", an analysis of air at the outlet of the compressor must be completed at six-month intervals.

Additionally, bottles and cylinders shall be rotated to ensure that the air supply is maintained in a fresh condition (not greater than six months old).

Hydrostatic Testing and Re-Certification Shall Be Completed as Follows:

- All steel and aluminum bottles - every 5 years.
- Fibreglass - wrapped aluminum breathing air cylinders - every 3 years.
- Kevlar breathing air cylinders - every 3 years.

Site Requirements

9.10 Number of SCBA at Work Locations

There shall be one SCBA unit available (specifically required at facilities where the presence of H_2S is likely) for each full-time operating position for the purpose of rescue in the event of a respiratory emergency.

For larger complexes having full time maintenance personnel, there should be one SCBA for every four maintenance positions to support short term work in situations requiring respiratory protection.

9.11 Location of SCBA

SCBAs shall be in a dry place that is not subject to vibration nor temperatures below 0° C or above 30° C. The storage of SCBAs in places where temperatures are outside the recommended range will affect user comfort and operability of the units.

SCBAs shall be placed in non-hazardous, easily accessible areas (away from potential fire hazards and potentially toxic atmospheres).

Storage areas shall be well identified and distributed throughout the complex. SCBAs shall be mounted (preferably on stands complete with protective covering over the unit) in a manner that an individual can put it on (don the unit) quickly in an emergency (e.g., straps fully extended).

9.12 Supplied Air Breathing Apparatus (SABA)

For routine work situations that require respiratory protection to be worn (e.g., changing hydrocarbon filters, changing valves in a sour gas compressor), a SABA mask complete with egress bottle attached to a reliable central or portable source of approved breathing air is preferred over SCBA as they are more efficient and economic.

There should be enough SABA and air lines at the facility to accommodate normal or planned work activities at that location.

9.13 Rescue of Personnel

A competent safety stand-by person must be immediately available and suitably equipped to perform an immediate rescue where work is being performed:

- In an atmosphere that is Immediately Dangerous to Life and Health (IDLH).
- In an atmosphere that is unknown or that may change from a safe condition to hazardous, at any time; and
- Where a worker's ability to evacuate a work area during an emergency is limited (e.g., restricted egress).

9.14 Spare SCBA Bottles

Each work site shall keep a fully charged spare SCBA bottle for every two complete units at the facility, as a normal complement.

This will allow for regular SCBA donning/use practice without the risk of running out of fully charged SCBA air cylinders when required for specific work activities or for emergency use.

9.15 Respirator Fit Testing

All employees, contract employees, and visitors to a sour gas facility, field location, or any area which may be subject to airborne contaminants must be clean-shaven where the respirator facepiece seals with the face.

9.16 Applicable Work Site

Work sites included are where:

- Airborne contaminants may exceed their Occupational Exposure Limits (OELs).
- Where the presence of H2S exceeds 10 ppm: or

- Where there is the potential for a reduced oxygen atmosphere (less than 19.5% by volume).
- The requirement for a close fit is especially important. The presence of a moustache, excessive facial hair, unusual face contours, scars, skin eruptions, eyeglasses, or missing dentures could interfere with the seal.
- It is for these reasons the respirator facepiece-to-face seal must be tested and a satisfactory fit must be obtained prior to each use.

9.17 Pre-Use Respirator Facepiece-to-Face Seal: Field Testing

The respirator facepiece-to-face seal can be tested:

- On a SCBA or SABA, by disconnecting the air supply hose and cupping the open palm of the hand over the air supply inlet and breathing in, and
- On a cartridge type respirator, by covering the inlet surface of the respirator cartridge and by breathing in.

  The vacuum created in the facepiece should pull the facepiece against the face and remain in this position until the palm of the hand is removed from the air supply hose inlet end, or from the cartridge surface.

- Field fit test checks must be performed each time a face seal dependent respirator is worn, and
- Most manufacturers provide instructions for field testing; if these are unavailable, CSA Standard, CAN/CSA-Z94.4-93, Selection, Use, and Care of Respirators should be followed.

9.18 Qualitative Respirator Fit Testing

(Using an Approved Testing Protocol)

All workers on Company work sites who may be expected to wear a SCBA, SABA, or cartridge type respirator must be fit tested using an acceptable protocol to determine the appropriate make and model of facepiece they are authorized to use.

Fit Testing Protocol Requirements

- The technician conducting the fit test must be trained in the fit testing protocol and the application of the protocol to the specific equipment and facepieces being tested.
- Records identifying the brand and size of the mask and the test results are retained for a minimum three (3) year period.
- The fit test is conducted annually.
- During the fit test, workers are provided training on the:
- Limitations of a face seal dependent respirator, and
- Use and care of the respirator.

9.19 Worker Training

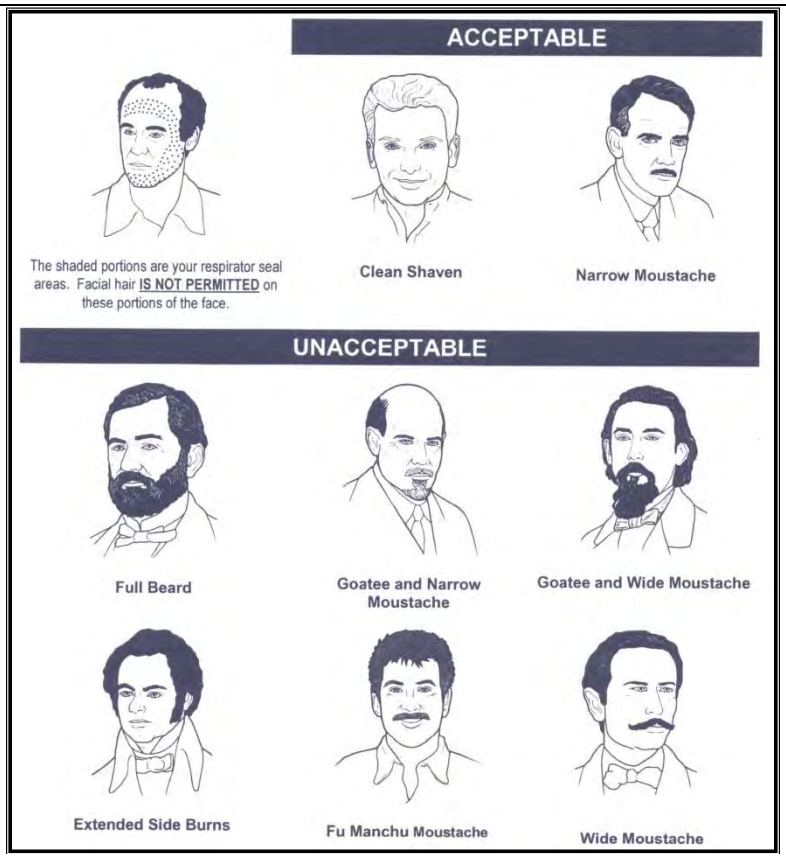
All personnel who may be required to use respiratory protective equipment shall be properly trained in the selection, use, and care of all of the types of respiratory protective equipment which they may be expected to use in their work activities.

All personnel working at a sour (H_2S) work site must attend and maintain current certification in the H_2S Alive Certificate (or equivalent) program.

This training shall be supplemented by onsite refresher training delivered via breathing apparatus donning/use and respirator training drills.

On-site update training shall include, but is not limited to:

- The opportunity to handle (work with) the apparatus in a practice session.
- The proper method of donning and wearing a SCBA, SABA, or cartridge-type respirator must be demonstrated by a competent person and practiced by all personnel.
- When personnel are wearing respiratory protective equipment, they should be questioned to determine if there is any feeling of anxiety or an insufficient supply of air.
- Personnel who express a concern with wearing respiratory protective equipment may require additional instruction (one-to-one training, if required); and
- Employees must be trained in the proper method of conducting a facepiece-to-face field test of all respiratory protective equipment devices that they may be required to use in their work activities. (negative and positive pressure test)
- With training, all workers should be aware of their responsibilities regarding the care and maintenance of respiratory protective equipment. These responsibilities include:
- **Being clean-shaven where the respirator facepiece seals with the face**.
- Checking the facepiece-to-face fit every time the facepiece is placed on the face (donned) to ensure a proper fit and face seal is obtained.
- Using the respiratory protective equipment only as designed and instructed.
- Taking care in the handling and use of respiratory protective equipment to avoid causing hidden damage which could affect the integrity of the system and the safety of future users of the equipment.
- Vacating immediately to an area that has non-contaminated air if the respirator fails to provide proper protection; and
- Reporting any respirator malfunction to a person responsible for the care and maintenance of the equipment.



-

9.20 Medical Surveillance

No personnel should be assigned a task that requires the use of respirators unless the individual is found physically capable of doing the work while wearing the respirator.

In addition, some regulatory standards for specific substances and occupations may also contain requirements for medical examinations.

These requirements specify that a physician should determine what health and physical conditions are pertinent and that a respirator wearer's medical status should be reviewed periodically. Pre-placement medical examinations should screen out those who are physically or psychologically unfit to wear respirators.

Medical tests pertinent to the respiratory hazards that workers may encounter should be made to get baseline data against which to assess physiological changes in the respirator wearer.
The worker's previous medical and employment history should also be considered.

9.21 Site Specific Safe Operating Procedure

Each operating facility shall conduct a hazard assessment of its activities and determine the requirements for respiratory protection use. Those activities requiring such protection shall be included in a site-specific safe operating procedure.

Caution: This program does not represent a complete guideline to the subject. If you are unsure of which type of respiratory protective equipment is required for the job, or unclear on how to safely use the equipment, consult your supervisor before selecting and using the equipment.

9.22 Related References

Supervisors and trainers are encouraged to consult the following technical documentation regarding the proper selection and use of respiratory protective equipment.

- Alberta Occupational Health & Safety Act, Regulation, and Code Part 18: Personal Protective Equipment, Alberta OH&S Code Part 5: Confined Spaces.
- Occupational Health & Safety Regulation, British Columbia Regulation 296/97, Part 8: Personal Protective Equipment, Respiratory Protection, 8.32 to 8.44; Part 9: Confined Spaces.
- Oil and Gas Occupational Safety and Health Regulations, under Part II of the Canada Labour Code, Part XII: Confined Spaces; Part XIII: Safety Materials, Equipment, Devices and Clothing, Respiratory Protection, Section 13.7 and 13.8.
- Corporate WHMIS, Toxic Atmospheres, Respiratory Protection, Gas Testing Certification, H2S Alive, Confined Space Pre-Entry and Confined Space Rescue, Entry Level Training Modules.

10.0 VEHICLES (COP 009)

10.1 Purpose

The purpose of this COP is to ensure Tallman Geological employees, consultants, contractors and other visiting personnel use vehicles in a safe manner.

10.2 Requirements

- The driver will walk around their vehicle prior to each trip to check for potential hazards such as objects, people or other vehicles prior to driving and observe the condition of the vehicle such as tires and lights are in good working condition and windows, lights and mirrors are clean.
- Seat Belts must always be worn while a vehicle is in motion.
- All equipment, tools or other cargo being transported in the box of the truck or cab shall be secured to prevent serious injury to occupants, in the event of a sudden stop or an incident.
- Posted speed limits shall not be exceeded and all vehicles must be driven in a manner that respects the road conditions. Reduce speed in areas with poor visibility and known wildlife traffic.
- It is the responsibility of the driver to inform their supervisor within the next working day of a drivers' license suspension. Failure to inform is considered a severe offence and will be subject to progressive discipline. Refer to the Tallman Geological Corporate Vehicle Policy.
- All drivers shall have their appropriate class of driver's licence and TDG certificate (if applicable) in their possession.
- Drivers who have accumulated six (6) or more driving demerit points will be required to notify their supervisor. They will be required to complete a driver skill improvement training course at the employees' cost. Completion of course documentation must be submitted for retention.
- All personnel driving while working for Tallman Geological are encouraged not initiate or receive a cell phone call while driving. It is recommended that the driver allow the voice messaging system to pick up the call. If it is necessary to hold a conversation via cell phone or radio, the driver may pull over when it is safe to do so and take the call at that time.
- Vehicles shall not be operated while under the influence of drugs or alcohol. Consult with your physician to determine if prescription medications will impair your ability to safely operate a vehicle. Refer to the Tallman Geological Corporate Vehicle Policy.
- Firearms shall not be carried in vehicles operating for Tallman Geological.
- Vehicles should be backed into parking stalls where it is legal or where drive-through parking is not possible. Where space permits, drive-through parking is the preferred technique for quick emergency egress.
- No vehicle shall encroach within 7.5 metres of any facility piping, process vessel or tank containing combustible fluids unless required by a specific maintenance or operating function and an appropriate risk assessment & hot work permit has been completed. Actual site conditions may dictate further controls.

- No vehicle may encroach within 3 meters of any wellhead, riser or load line unless required by a specific maintenance or operating function and an appropriate risk assessment & hot work permit has been completed.
- Passenger numbers shall be limited to the maximum as allowed under manufacturer's design specifications.

10.3 Towing and Tow Straps

- A nylon braided tow strap is the only acceptable means of connecting vehicles (except for tow trucks).
- Vehicles must be equipped with the manufacturers' specified towing hooks or properly mounted towing hitch.
- Tow trucks are to be used as the first choice for towing.
- There should be constant tension on the tow strap when towing, it should not be 'jerked'.

10.4 Scope of Boosting and Jump Starting

- When boosting or jump starting, both batteries must be the same voltage and the vehicles must not be touching
- The vehicles must be in 'park or neutral' with parking brakes on and both engines shut off.
- Put the booster cables on the positive battery posts first, then put the negative cable on the good battery and finally ground the last cable to the engine block of the vehicle with the dead battery.
- Keep clear of the vehicles during the boosting operation and use the reverse procedure to remove the cables.
- Always wear eye protection when boosting or jump starting a vehicle.

10.5 Vehicle Incident Reporting

- All vehicle incidents shall be reported as soon as practicable to immediate supervisor and the fleet administrator. Written report is required within 24 hours.

10.6 Material Handling

- Site-specific materials handling and transportation procedures may be required.
- Transportation of Dangerous Goods (TDG) certificate and the TDG applicable permits must be carried in the vehicle where applicable.

10.7 Vehicle Maintenance

- Always refer to the vehicle owner's service manual for the proper maintenance inspections and required service.
- Monthly vehicle checklist must be filled out by the designated driver for that vehicle. These checklists are to be maintained and kept with vehicle.

10.8 Driver Fatigue

- Fatigue and stress are two common mental factors which affect a drivers' ability to perform. When a driver finds they are in this condition, they should either not drive or pull over and take a break or a nap.

- Driving time should be taken into consideration as part of the hours of travel and work for that day to address the issues of fatigue and journey management.

10.9 Safety Equipment

- All assigned operating vehicles owned or leased by Tallman Geological will have standard safety equipment to include an approved first aid kit, company vehicle safety kit, winter kit and fire extinguishers.

This page has been intentionally left blank.

APPENDIX C - FIRST AID

1.0 ALBERTA FIRST AID REQUIREMENTS

First aid requirements for High Hazard Work

Number of workers at work site per shift	**Close work site (up to 20 minutes)**	**Distant work site (20 to 40 minutes)**	**Isolated work site (more than 40 minutes)**
1	Type P First Aid Kit	Type P First Aid Kit	Type P First Aid Kit
2 to 4	1 Emergency First Aider No. 1 First Aid Kit	1 Standard First Aider No. 2 First Aid Kit 3 blankets	1 Standard First Aider No. 2 First Aid Kit 3 blankets
5 to 9	1 Emergency First Aider 1 Standard First Aider No. 2 First Aid Kit	2 Standard First Aiders No. 2 First Aid Kit 3 blankets	2 Standard First Aiders No. 2 First Aid Kit 3 blankets
10 to 19	1 Emergency First Aider 1 Standard First Aider No. 2 First Aid Kit 3 blankets	2 Standard First Aiders No. 3 First Aid Kit 3 blankets, stretcher, splints	2 Standard First Aiders No. 3 First Aid Kit 3 blankets, stretcher, splints
20 to 49	2 Emergency First Aiders 1 Standard First Aider No. 2 First Aid Kit 3 blankets	3 Standard First Aiders No. 3 First Aid Kit 3 blankets, stretcher, splints	3 Standard First Aiders No. 3 First Aid Kit 3 blankets, stretcher, splints
50 to 99	2 Emergency First Aiders 2 Standard First Aiders No. 3 First Aid Kit 3 blankets	2 Emergency First Aiders 3 Standard First Aiders No. 3 First Aid Kit 3 blankets, stretcher, splints	4 Standard First Aiders 1 Advanced First Aider No. 3 First Aid Kit 3 blankets, stretcher, splints
100 to 199	2 Emergency First Aiders 2 Standard First Aiders 1 Advanced First Aider First Aid Room	4 Standard First Aiders 1 Advanced First Aider First Aid Room	4 Standard First Aiders 1 Advanced First Aider First Aid Room
200 or more	2 Emergency First Aiders 2 Standard First Aiders 1 Nurse or 1 EMT-P **Plus** 1 Standard First Aider for each additional increment of 1 to 100 workers First Aid Room	4 Standard First Aiders 1 Nurse or 1 EMT-P **Plus** 1 Standard First Aider for each additional increment of 1 to 100 workers First Aid Room	4 Standard First Aiders 1 Advanced First Aider 1 Nurse or 1 EMT-P **Plus** 1 Standard First Aider for each additional increment of 1 to 100 workers First Aid Room

Note: Number of first aiders indicated is for a shift at all times.

2.0 SASKATCHEWAN FIRST AID REQUIREMENTS

Minimum: Every place of employment requires a first aid box containing standard supplies, a manual, a first aid register and emergency information.

# of Workers	Close (1/2 hour or less to medical facility)	Distant (1/2 - 2 hours to medical facility)	Isolated (More than 2 hours' surface transport to medical facility, or normal mode of transport is aircraft)
1	minimum	minimum	minimum
2-4	minimum	minimum plus • blankets, stretcher & splints • Class A attendant & additional supplies - if high hazard work	minimum plus • blankets, stretcher & splints • Class A attendant & additional supplies - if high hazard work
5-9	minimum plus • Class A attendant & additional supplies - if high hazard work	minimum plus • Class A attendant & additional supplies - if high hazard work • blankets, stretcher & splints	minimum plus • Class A attendant & additional supplies - if high hazard work • blankets, stretcher and splints
10-20	minimum plus • Class A attendant & additional supplies - if high hazard work	minimum plus • Class A attendant & additional supplies - if high hazard work • blankets, stretcher & splints	minimum plus • Class A attendant & additional supplies - if high hazard work • blankets, stretcher & splints
21-40	minimum plus • Class A attendant & additional supplies - if high hazard work	minimum plus • Class A attendant & additional supplies - if high hazard work • blankets, stretcher & splints	minimum plus • Class B attendant & additional supplies – if high hazard work • Class A attendant & additional supplies if not high hazard work • blankets, stretcher & splints
41-99	minimum plus • Class A attendant & additional supplies - if high hazard work	minimum plus • Class B attendant and additional supplies - if high hazard work • Class A attendant & additional supplies for other work • blankets, stretcher & splints	minimum plus • Class A attendant & additional supplies – if low hazard work • EMT – if high hazard work • Class B attendant & additional supplies for other work • blankets, stretcher & splints
100+	minimum plus • 2 Class A attendants & additional supplies - if high hazard work	minimum plus • first aid room • 1 EMT & 1 Class B attendant & additional supplies - if high hazard work • 2 Class A attendants & additional supplies for other work • blankets, stretcher & splints	minimum plus • first aid room • 1 EMT & 1 Class B attendant & additional supplies - if high hazard work • 2 Class A attendants & additional supplies for low hazard work • 2 Class B attendants & additional supplies for other work • blankets, stretcher & splints

Note: Low hazard work is work of an administrative, professional or clerical nature that does not require substantial physical exertion or exposure to work processes, substances or other conditions that are potentially hazardous.

This page has been intentionally left blank.

APPENDIX D – FORMS AND CHECKLISTS

1.0 Forms

- Ground Disturbance

Ground Disturbance Checklist/Permit

(Hazard Assessment & Control)

When a ground disturbance is to take place for any reason, the following checklist/permit shall be utilized. The purpose 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.

LOCATION (LSD):		DATE:	
SCOPE OF WORK			
Designated Ground Disturbance Supervisor:		Ph No:	
Alternate Ground Disturbance Supervisor:		Ph No:	
Tallman Supervisor		Ph No:	
Site Operator and/or Supervisor:		Ph No:	
Contractor Company Name:		Ph No:	
Contractor Foreman / Representative:		Ph No:	

PRE-PLANNING CONFIRMATION CHECKLIST:				**GROUND DISTURBANCE DESCRIPTION/COMMENTS:**
Before Ground Disturbance Activities, have you:	**Y**	**N**	**N/A**	***All N/A's MUST be explained!***
Obtained & Reconciled current surveys, drawings, past files?	☐		☐	
Obtained & Reconciled Certificate of Title / Land Standing Report?	☐		☐	
Obtained & Reconciled base maps and pipeline info?	☐		☐	
Obtained & Reconciled previous As-built drawings of facilities?	☐		☐	
Obtained & Reconciled necessary Crossing Agreements?	☐		☐	
Completed Record Sheet (over page)?	☐		☐	
Discussed Scope of Work with local Operations?	☐		☐	
Called One-Call-Systems and Verified? (48 hrs notice)	☐		☐	Ticket #
Contacted other companies not on One-Call? (48 hrs notice)	☐		☐	
Searched for markers / identification signs?	☐		☐	
Searched for visible signs of underground facilities?	☐		☐	
Discussed possible underground facilities with Landowner?	☐		☐	
Obtained necessary Landowner approvals?	☐		☐	
Established length & width & depth of excavation (**Workspace**)?	☐		☐	
Located, marked, and mapped all known underground facilities?	☐		☐	
Conducted a 30-m sweep outside work area (**Search Area)**?	☐		☐	
Arranged for Owner of line(s) to witness & approve line locates?	☐		☐	
Identified and marked overhead power lines?	☐		☐	
Contacted & Reconciled info with Site Supervisor?	☐		☐	
Contacted & Reconciled info with Site Operator(s)?	☐		☐	
Identified isolation points of any underground facilities?	☐		☐	
Notified regulatory agencies of the planned ground disturbance?	☐		☐	
Arranged to hand expose lines within 5-m (**Dig Zone**)?	☐		☐	
Determined if work will undermine structures or foundations?	☐		☐	
Evaluated ground conditions (frozen, water saturated, etc)?	☐		☐	
Noted visible water course crossings?	☐		☐	
Do workers have required training? (FA, H_2S, WHMIS, Fire, GD)	☐		☐	

PRE-GROUND DISTURBANCE CHECKLIST: ***(at pre-job / tailgate meeting)***				**GROUND DISTURBANCE DESCRIPTION/COMMENTS:**
Has the following been observed?	**Y**	**N**	**N/A**	***All N/A's MUST be explained!***
Is the Designated Ground Disturbance Supervisor on-site?	☐			
Has On-Site GD Supervisor and Contractor Foreman/Rep signed?	☐			
Is Ground Disturbance Pre-Planning Checklist above complete?	☐		☐	
Is a Site-Specific Emergency Transportation Plan in place?	☐			
Is applicable documentation, drawings, etc available on site?	☐		☐	
Are all locate markers/stakes current and visible on site?	☐		☐	
Are underground facilities hand exposed within 5-m **Dig Zone**?	☐		☐	
Has the Ground Disturbance COP been reviewed with all workers?	☐		☐	
Has area & equipment been examined for potential hazards?	☐			
Is First Aid, Gas Detection, & Fire Fighting equipment available?	☐		☐	

Ground Disturbance Checklist/Permit

Is a competent signal / spotter person established for excavation?	☐	☐	
Is spoil pile area established 1-m from edge of excavation?	☐	☐	
Will other work in area affect you and/or will you affect it?	☐	☐	
Have Confined Space Entry Egress requirements been addressed?	☐	☐	
Have line size, operating press and substances been identified?	☐	☐	
Are barricades/fences available and in place, if necessary?	☐	☐	
Have locates been done by 2 separate Locators in congested areas?	☐	☐	
Are all the conditions of the Crossing Agreement being met?	☐	☐	
Has proper shoring and bracing been installed, if necessary?	☐	☐	
Ensured no mechanical digging within 60-cm of buried facilities?	☐	☐	
Have as-builts been drawn of any new and existing buried facilities?	☐	☐	
Backfill Inspection report completed before backfilling?	☐	☐	

"If you lose sight of the Underground Facility, STOP"

Designated Ground Disturbance Supervisor and the Contractor Foreman / Representative mutually agree that the Pre-Planning Checklist has been completely satisfied and that it is safe to proceed with the Ground Disturbance. (MUST be **signed off** before Ground Disturbance commences). Ensure foreign owners are notified 24 hours before backfilling. Complete backfill inspection, including pictures, as-builts, and submit documentation for filing.

Designated Ground Disturbance Supervisor: ***(signature)***	
Contractor Foreman / Representative: ***(signature)***	
Others (Identify) ***(signature)***	

Pipelines, Surveys, Agreements, Other Underground Facilities, Record Sheet Checklist

LOCATION: _____ **DATE:** _____

JOB SCOPE: _____

_____

_____

PIPELINES

Owner	License #	Line #	Size	From	To

OTHER UNDERGROUND FACILITIES

Owner	Description

CROSSING AGREEMENTS

Owner	Description

ONE-CALL / OTHER OWNERS RECORDS

Owner	Description

OTHER INFO (Surveys, Permits, Approvals, Land Titles, Plot Plans, As-Builts, etc.)

Info Type	Description

COMMENTS: _____

_____

_____

"If you lose sight of the Underground Facility, STOP"

PRE-JOB MEETING ATTENDANCE: **(add page if required)**

Print Name	*Signature*		*Print Name*	*Signature*

DESIGNATED GROUND DISTURBANCE SUPERVISOR SIGNATURE _____

2.0 Checklist

- Ground Disturbance Pre-Job Review
- Daily Fit for Work Checklist (Covid 19)

Ground Disturbance Checklist/Permit

BEFORE STARTING THE GROUND DISTURBANCE, THESE KEY POINTS BELOW MUST BE REVIEWED BY ALL WORKERS INVOLVED IN THE GROUND DISTURBANCE

Critical Ground Disturbance: (mechanical excavation within 5 meters of a U/G facility)

	Boxes must be checked
• Review with all workers involved in the GD ▪ Scope of the work ▪ Line Locates	☐
• Should the Ground Disturbance Supervisor have to leave the dig site, the Ground Disturbance MUST STOP until supervisor returns.	☐
• Line Locating stakes are all in place and must be for the entire excavation.	☐
• Ensure Spill Pile is always at least 1 meter back from ditch.	☐
• Hydro-Vac slots are in place, so the entire dig site shows the alignment of line or lines. Should the Excavation have to be extended past the last slot, new slots must be in place before GD is continued & a new SWA defining scope.	☐
• The line must always be exposed before and during any mechanical excavation can take place. This means working with Hydro-vac or hand exposure while excavating the lines.	☐
• All U/G facilities within 5 meters of a mechanical excavation must be hand exposed prior to commencement of the ground disturbance including but not limiting pile installs.	☐
• An excavation greater than 1.5 meters deep and entered by a worker is to be treated as a confined space and must comply with the *Confined Space Entry COP.* Unless controls have been put in place such as proper shoring, proper exits from the excavation. (atmosphere testing, shoring, exits every 7.6 m).	☐
• Ground Disturbance work will stop immediately if any contact with a regulated U/G facility causes damage to the coating; or punctures or cracks in the facility; or scratches, gouges, flattening or dents to the surface. Meaning all equipment stays in place of line contact. Approval from the owner/operator, the AER, the NEB or other appropriate government agency will be required before ground disturbance can continue.	☐
• No Mechanical Excavation within 1.5 meters of a buried facility, UNLESS the Ground Disturbance is under DIRECT supervision of the Facility owner Representative.	☐
• If the Scope of Work changes the job must STOP and the hazards reassessed, and a new *Ground Disturbance Permit and Hazard Assessment* must be completed	☐

This page has been intentionally left blank.

DAILY FIT FOR WORK SCREENING QUESTIONNAIRE

We require you to fill out the below questionnaire to assist in determining your fitness to work during the COVID19 pandemic to provide a safe environment for all employers/employees at Tallman Geological.

The information in this questionnaire is collected under the authority of Tallman Geological and will be used and disclosed solely for the purposes of determining fitness for work during the COVID-19 pandemic.

Always ensure you are following protocols for hand hygiene and remember to clean all surfaces in the air trailer and truck, pens, door handle, your keys, phone, computers and other personal items. This needs to be done multiple times throughout the day.

Printed Name:_____ Signature:_____ Date: _____

Risk Assessment: Screening Questions

1.Do you have any of the symptoms below which are new or have worsened if linked to a chronic condition?	Please Check	
	YES	NO
• Fever greater than 38 degrees Celsius		
• Cough		
• Shortness of breath		
• Difficulty breathing		
• Sore throat		
• Runny Nose		
2. Have you returned to Canada from outside the country (including USA) in the past 14 days?		
3. Do you live with or have had close contact (within 2 meters/6 feet) with a person with an influenza-like illness (ILI) who had travelled outside of Canada in the 14 days before their illness started, while not wearing recommended PPE at work.		
4. Do you live with or have had close contact (within 2 meters/6 feet) with a person with an influenza-like illness (ILI) who had close contact with a lab-confirmed COVID-19 case, while not wearing recommended PPE*.		
5. Have you had close contact (within 2 meters/6 feet) with a confirmed or probable case** of COVID-19, while not wearing recommended PPE.		

If you answer "YES" to any of the above, you will not be permitted to attend work at this time, and you must self-isolate.

If you answer "NO" to all the above, you can proceed to work.

***Close contact** is an individual that provided care for the case, including healthcare workers, family members or other caregivers, or who had other similar close physical contact without consistent and appropriate use of personal protective equipment (PPE), OR lived with or otherwise had close prolonged contact (within 2 meters/ 6 feet) with a person while the case was ill, OR had direct contact with infectious body fluids of a person (e.g. was coughed or sneezed on) while not wearing recommended PPE.

***Probable case** is a person with clinical illness who is linked to a lab-confirmed COVID-19 case, OR a person with clinical illness who meets the COVID-19 exposure criteria, AND in whom laboratory diagnoses of COVID-

19 is inconclusive.

***PPE** is not expected to apply in the home setting.

These questionnaires are to be done daily and sent to Jared McLeod DAILY.

APPENDIX E – SAFE WORK PRACTICES

Type of Work: Geological Well-site Consulting

Purpose: To ensure personal safety at the workplace

1. Arriving at job site: park in a safe area with truck pointed in the direction of the closest exit. Before unloading truck note potential hazards to the lab and sleep shack (trenches and uneven ground surfaces). While unloading truck use proper lifting techniques (bent legs and straight back).
2. In lab while working with chemicals always use proper PPE (safety glasses and rubber gloves).
3. While outside the lab on or near rig floor: proper PPE must always be worn (steel toed boots, fire retardant cover-all's, hard hat, safety glasses and ear plugs). Make sure proper lifting techniques are used while hooking up or repairing gas detector. Before using a tool provided by the rig make sure it is in good working order.

_____ _____

Jared McLeod (Partner) Date

Safe Job Procedures (Job Hazard Analysis)

Job	Working with Hydrochloric Acid		
	Tools / Equipment Required	**Materials Required**	**Personal Protective Equipment**
	Porcelain or Pyrex glass, glass dropper, candle, pliers.	10% Hydrochloric Acid (H2S)	Safety Glasses
Steps	**Sequence of Steps**	**Potential Accidents / Hazards**	**Recommended Safe Job Procedure**
1	With the aid of a dropper saturate the sample with the acid	a. eye irritation	a. Use safety glasses
	.	b. skin irritation	b. Always add the acid to the rock, not the rock sample to the acid.
2	Heat sample if needed	a. eye irritation	a. Use safety glasses
		b. skin irritation	b. Always add the acid to the rock sample
		c. respiratory problems	c. Turn on hood fan. Make sure there is good ventilation.
		d. burn	d. Only use a candle when heating the Pyrex glass. Do not use the gas stove as it burns too hot and the glass may break.
			e. Hold glass with pliers. Do not hold glass with tweezers as the glass may tip.
			Read "Hydrochloric Acid Safe Handling Guideline". (Given to all Tallman Geological Geologists at orientation).
		Name / Position / Date	
	Developed By:	Guy Tallman, President August 14, 2010	
	Reviewed By:		
	Revised By:		

Safe Job Procedures (Job Hazard Analysis)

Job	**Working with Trichloroethylene**		
	Tools / Equipment Required	**Materials Required**	**Personal Protective Equipment**
	Porcelain or Pyrex glass, glass dropper	Trichloroethylene	Rubber Gloves, Safety Glasses,
Steps	**Sequence of Steps**	**Potential Accidents / Hazards**	**Recommended Safe Job Procedure**
1	With the aid of a dropper saturate the sample with the chemical	a. Potential fire. Trichloroethylene is very flammable	Work in a clean and tidy lab
			Extinguish all flames before using
		b. skin irritation	Use proper personal protective equipment (rubber gloves, glasses).
		c. eye irritation	
			Read the safety sheet "Health Effects of Trichloroethylene". Written by the Canadian Centre for Occupational Health and Safety. (Given to all Tallman Geological Geologists at orientation).
		Name / Position / Date	
	Developed By:	Guy Tallman, President August 14, 2010	
	Reviewed By:		
	Revised By:		

This page has been intentionally left blank.

APPENDIX F – GLOSSARY OF TERMS

ADMINISTRATIVE CONTROL
Controls that alter the way work is done with the goal of reducing the duration, frequency, and severity of exposure to hazards. Includes schedules, policies, work practices, procedures, training, housekeeping, and safety rules.

ALARA
As Low as Reasonably Achievable

ANSI
American National Standards Institute

APPROVED
Refers to approval by a recognized testing agency or authority for use under existing conditions (e.g. NIOSH, CSA)

ATV
All-Terrain Vehicle

BLANKING/BLINDING
Equipment used to isolate piping and prevent accidental exposure to or release of flammable or toxic liquids or gases into work areas.

BOP
Blowout Preventer

CAPP
Canadian Association of Petroleum Producers

CARCINOGEN
A cancer-producing substance or agent

CCOHS
Canadian Centre for Occupational Health and Safety

COMPETENT
Competent, when referring to a worker, means adequately qualified, suitably trained and with sufficient experience to safely perform work without or with minimal supervision.

CONFINED SPACE
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 has the potential or inherent characteristics of any activity which can produce adverse or harmful consequences within the space. Confined spaces include but are not limited to: tanks, bins, vessels, towers, furnaces, tank cars, sewers, pipeline, sumps, utility tunnels, dyked areas, excavations, boilers, silos, ventilation and exhaust ducts, vessel skirts, utility vaults, valve wells and pipe racks.

CONFINED SPACE ENTRY (CSE)
A person is considered to have entered a confined space when that person has sufficiently approached or passed the threshold of the confined space, to be essentially breathing the atmosphere of the confined space.

CONTROLLED PRODUCT
A product, material or substance included in any of the classes listed in Schedule II of the Hazardous Products Act (specified by the regulations made pursuant to paragraph 15 (1) (a) of the Act).

CPR
Cardiopulmonary Resuscitation (a first aid “Life Revival” technique)

CSA
Canadian Standards Association

dBA
Decibel (A weighting)

DETECTION SYSTEM
A device or control to identify hazardous, potentially hazardous, or abnormal conditions and to provide a warning to people and/or prevent loss.

ECON
Saskatchewan Ministry of the Economy

eGSO
Electronic General Safety Orientation

EMPLOYEE
Any person employed by a company, including managers, supervisors, and workers.

EMPLOYER
Means a person, who is self-employed in an occupation, or a person who employs 1 or more workers, or a person designated by an employer as his representative, or a director or officer of a corporation who oversees the occupational health and safety of the workers employed by the corporation (OH&S).

ENGINEERING CONTROL
Methods of controlling employee exposure to safety and health hazards by enclosing the hazard, isolating the employee from the hazard, or reducing the transmission of the hazard to the employee, without the use of personal protective equipment.

ERP
Emergency Response Plan

FIRST AID
One-time treatment of minor scratches, cuts, burns, etc. with possible follow-up visits for observation, but not treatment.

FLAMMABLE LIQUID
Any liquid with a flash point below 200°F.

FLASH POINT
The lowest temperature at which vapours over volatile combustible substances will ignite when exposed to external sources of ignition (and will continue to burn after the source is removed).

FRW
Fire Retardant Work Wear.

FUGITIVE EMISSION
Gas, solid, liquid, fume, mist, fog, or dust that escapes, unplanned from process equipment, emission control equipment or from a product.

HANDLING
Storing, dispensing, and disposing of materials or containers.

HARMFUL SUBSTANCE
A substance which 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.

HAZARD CLASSIFICATION
A designation of relative loss potential. A system that classifies substandard practices or conditions by the potential severity of the loss, should an accident or loss occur.

HAZARDOUS CONDITION
Any situation which exposes workers to a physical, chemical, electrical, high energy, etc. hazard that may adversely affect their health or safety.

HAZARDOUS ENERGY
Means electrical, mechanical, hydraulic, pneumatic, chemical 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.

HAZARDOUS LOCATION
A place where fire or explosion hazards may exist due to flammable gases or vapours, flammable or combustible dust or ignitable fibres or flyings, as described in the *Canadian Electrical Code*

HAZARDOUS PRODUCT
Any product that is prohibited, restricted, or controlled, and can cause harm to workers or the environment.

HOT WORK
Any work involving burning, welding, riveting, grinding or other similar fire or spark-producing tools or operations, as well as work which produces a source of ignition, such as drilling, abrasive blasting, and space heating.

H_2S
Hydrogen Sulphide

IDLH
Immediately Dangerous to Life and Health

INCIDENT
An undesired event that results in physical harm to a person, damage to equipment, property or the environment, or loss of process or product (results in actual loss).

INSPECTION
The careful examination of people, equipment, materials, and the environment, the close and critical scrutiny for comparison with standards.

IRP
Industry Recommended Practice

ISOLATE
Means using a mechanical device to restrain, regulate, direct, or dissipate hazardous energy.

ISOLATION
A process whereby a confined or isolated space is completely protected against the inadvertent release of material or energy.

JOB/TASK ANALYSIS
A systematic analysis of the steps involved with doing a job/task, the loss exposures involved, and the controls necessary to prevent loss. It should be a prerequisite to the development of work procedures and practices. An important step in the analysis would be consideration of the elimination or reduction of hazards.

KILONEWTON
A kiloNewton is 1000 Newtons. A Newton is defined as the force required to accelerate the mass of one kilogram at a constant one meter per second per second.

kV
Kilovolt

LC_{50}
Lethal concentration. LC_{50} indicates the atmospheric concentration of a substance at which half of the group of test animals die after a specified exposure time.

LD_{50}
Lethal dose: lowest dose of a substance introduced by any route, other than inhalation, over any given period in one or more divided portions and reported to have caused death in half of the test animals.

LEL
Lower explosive limit. The minimum concentration of a combustible gas or vapour in air, expressed in percent by volume, which will ignite if an ignition source is present.

LOST-TIME INJURY INCIDENT
An incident that causes a person to be away from work beyond the day of the injury.

OR

A disabling injury where the employee was not able to show up for his or her regular work shift the next day.

LSD
Legal Subdivision

MANUFACTURER'S RATED CAPACITY

The manufacturer's specifications, instructions or recommendations which outline how equipment is to be erected, installed, assembled, started, operated, used, handled, stored, stopped, adjusted, maintained, repaired, or dismantled. They may include manufacturer's instruction, operating or maintenance manual and drawings.

MECHANICAL VENTILATION
Removal by mechanical means of gases, dust, etc., at their source or origin.

MEDICAL AID
An injury that requires treatment from a professional medical doctor or dentist. The injury is not severe enough to prevent the employee from returning to work the next day.

NEAR MISS
An undesired event that, under slightly different circumstances, could have resulted in personal harm, property damage, or loss to process.

NEB
National Energy Board

NFPA
National Fire Protection Association

NIOSH
National Institute for Occupational Safety and Health

NON-ROUTINE WORK
Activities that are not generally performed on a regular basis.

NORM
Naturally Occurring Radioactive Material

OCCUPATIONAL ILLNESS
Any abnormal condition or disorder of an employee (other than one resulting from an occupational injury), caused by exposure to environmental factors associated with employment.

OCCUPATIONAL INJURY
Any injury that results from a work accident or from exposure to environmental factors associated with employment.

OEL
Occupational Exposure Limit

OH&S
Occupational Health and Safety

OWNER
In respect of a work site means the person in legal possession of the work site or, if the person in legal possession does not request the work, the person with an ownership interest in the work site who requests that the work be done (OH&S).

PPM
Parts Per Million

PRIME CONTRACTOR
Means the contractor, employer or other person who enters into an agreement with the owner of the work site to be the prime contractor, or if no agreement has been made, or if no agreement is in force, the owner of the work site (OH&S).

PROCEDURE
An established and defined method of performing specified work.

PSV
Pressure Safety Valve

PURGE
To rid of impurities or undesirable by bleeding, venting, etc., generally with steam, inert gas, nitrogen or $C0_2$.

RESPIRATORY PROTECTION
Refers to any respiratory protective device or system designed to protect the wearer from inhalation of toxic or irritating substances. It can include air-purifying respirators, supplied air respirators or self-contained breathing apparatus.

RESTRICTED SPACE
An enclosed or partially enclosed space that is not designed or intended for continuous human occupancy with a restricted means of entry or exit and may become hazardous to a worker entering it because of its design, construction, location or atmosphere; the work activities, materials or substances in it; provision of first aid, evacuation, rescue or other emergency response service is compromised or of other hazards relating to it.

RCMP
Royal Canadian Mounted Police

ROUTINE WORK
A usual or regular method of completing a task that is unvarying. Accompanied by a procedure or protocol.

SABA
Supplied-Air Breathing Apparatus

SAFETY DATA SHEET (SDS)
An information sheet containing health and safety information on the handling and storage of a product.

SECURE
Refers to an energy-isolating device that cannot be released or activated by removing any activating device, attaching a lock to the energy-isolating device that is operated by a key or similar device, or attaching to the energy-isolating device a mechanism other than a lock which is designed to withstand inadvertent opening without the use of excessive force, unusual measures, or destructive techniques.

SCBA
Self-Contained Breathing Apparatus

SHORING
A system composed of steel plate and bracing, welded, or bolted together to support the walls of a trench from the ground level to the trench bottom. The shield can be moved along as the work progresses.

SO2
Sulphur Dioxide

SPECIFICATIONS
The written instructions, procedures, drawings, or other documents of a professional engineer or employer. They can relate to equipment, work process or operation.

SPOIL
The material resulting from an excavation.

SUB-CONTRACTOR
An individual or company hired to perform all, or part of the work contracted to someone else. Means a person, partnership, or group of persons who, through a contract, an agreement or ownership, who works for a contractor, and may direct the activities of one or more employees or workers involved in work at a work site.

SUPERVISOR
Any person who has charge of a workplace or authority over any worker.

SUPPLIER
Means a person who rents, leases, erects, installs, or provides any tools, appliances, or equipment, or who sells or otherwise provides any designated substance or hazardous material to be used by a worker in respect of any occupation, project, or work site (OH&S).

TDG
Transportation of Dangerous Goods (Act).

TOXIC SUBSTANCE
Any substance that is present or has the potential to be present in concentrations which may adversely affect the health of an exposed individual, as defined by provincial chemical exposure regulations.

TOXICITY
The ability of a chemical to cause harmful effects in a biological system.

TRENCH
A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 4.6m (15 feet).

UEL
Upper explosive limit or the maximum proportion of vapour or gas in air above which propagation of flame does not occur.

ULC
Underwriters' Laboratories of Canada

UTV
Utility Task Vehicle

VAPOUR
The gaseous state of a substance that is solid or liquid under ordinary conditions, standard atmospheric temperature, and pressure.

WCB
Workers' Compensation Board

WHMIS
Workplace Hazardous Materials Information System

WORKER
Means a person engaged in an occupation or any person who is in a contract of service, written or oral, express or implied (OH&S & WCB). An employee under the supervision of a manager or supervisor.

WORKSITE
Means a location where a worker is, or is likely to be, engaged in any occupation and includes any vehicle or mobile equipment used by a worker in an occupation (OH&S).

ZERO ENERGY
A piece of equipment is in a state of zero energy when all sources of energy (e.g. electrical, mechanical, hydraulic, pneumatic pressures, spring tension, gravitational etc.) are effectively blocked or isolated and physically prevented from being energized by an isolation device.

This page has been intentionally left blank.

MSDS

Trichloroethylene
Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene
Catalog Codes: SLT3310, SLT2590
CAS#: 79-01-6
RTECS: KX4560000
TSCA: TSCA 8(b) inventory: Trichloroethylene
CI#: Not available.
Synonym:
Chemical Formula: C2HCl3

Contact Information
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: 1 -800-901-7247
International Sales: 1 -281 -441 -4400

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-440O

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroethylene	79-01-6	100

Toxicological Data on ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg (Rat). 2402 mg/kg [Mouse]. DERMAL (1D50): Acute: 20001 mg/kg [Rabbit]

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified + (proven) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well-ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.
Auto-ignition Temperature re: 420" C (788" F)
Flash Points: Not available.
Flammable Limits: LOWER:8% UPPER: 10.5%
Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.
Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.
Special Remarks on Fire Hazards: Not available.
Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Keep locked upkeep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/

Section 7: Handling and Storage

Precautions:

Keep locked up. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapour/spray. Wear suitable protective clothing in case of insufficient ventilation, wear suitable respiratory equipment lf ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Physical state and appearance: Liquid.
Odor: Not available.
Taste: Not available.
Molecular Weight: 131 .39 g/mole
Color: Clear Colorless.
pH (1% soln/water): Not available.
Boiling Point: 86.7'C (188.1"F)
Melting Point: -87.1"C (-124.8"F)
Critical Temperature: Not available.
Specific Gravity: 1.4649 (Water = 1)
Vapor Pressure: 58 mm of Hg (@ 20"C)
Vapor Density: 4.53 (Air = 1)
Volatility: Not available.
Odor Threshold: 20 PPm
Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = Q
Ionicity (in Water): Not available.
Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.
Solubility: Easily soluble in methanol, diethyl ether, acetone. Very slightly soluble in cold water.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 50 STEL: 200 (ppm)from ACGIH (TLV)TWA: 269 STEL: 1070 (mg/m3) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.
Odor: Not available.
Taste: Not available.
Molecular Weight: 131 .39 g/mole
Color: Clear Colorless.
pH (1% soln/water): Not available.
Boiling Point: 86.7 °C (188.1°F)
Melting Point: -87.1°C (-124.8°F)
Critical Temperature: Not available.
Specific Gravity: 1.4649 (Water = 1)
Vapor Pressure: 58 mm of Hg (@ 20°C)
Vapor Density: 4.53 (Air = 1)
Volatility: Not available.
Odor Threshold: 20 PPm
Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = Q
Ionicity (in Water): Not available.
Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.
Solubility:
Easily soluble in methanol, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.
Instability Temperature: Not available.
Conditions of instability: Not available.
Incompatibility with various substances: Not available.
Corrosivity:
Extremely corrosive in presence of aluminium. Non-corrosive in presence of glass.
Special Remarks on Reactivity: Not available.
Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.
Toxicity to Animals:
Acute oral toxicity (LD50): 2402 mg/kg [Mouse]. Acute dermal toxicity (LD50): 20001
Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH" The substance is toxic to kidneys, the nervous system, liver, liver, upper respiratory tract. Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.
BODS and COD: Not available.
Products of Biodegradation: Possibly hazardous short-term degradation products are not likely. However, long term degradation products may arise
Toxicity of the Products of Biodegradation: The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.
Identification: Trichloroethylene: UN17.l 0 PG: lll
Special provisions for transport: Not available.

Notice to reader

Tallman Geological Consulting Ltd. provides this information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a professionally trained person. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose. Tallman Geological Consulting Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. Tallman Geological Consulting Ltd. will not be responsible for damages resulting from use or reliance upon this information.

Hydrochloric Acid 10% Solution

PRODUCT NAME: **Hydrochloric Acid 10% Solution**

WHMIS CODES: C D2B

1. Product Identification

Chemical Name:	Hydrochloric acid
Chemical Family:	Hydrochloric acid
Chemical Formula:	HCl.H2O
Molecular Weight:	36.46
Trade Name-synonym:	Hydrochloric acid 10%

2. Composition / Ingredients

Hazardous Ingredient	WT / WT	CAS #	Toxicity Data	Exposure Limits
Hydrochloric acid	1 – 15%	7647-01-0	LC50:1108 ppm/1H Inhalation, Rat LD50:900 mg/kg Oral, rabbit	5 ppm ceiling (OHSA)

3: Physical Data

Physical State:	Liquid
Odour and Appearance:	Clear, slightly yellow liquid, with sharp odour
Odour Threshold (ppM):	No data
Specific Gravity:	Not determined
Vapour Pressure (mm Hg):	Not determined
Vapour Density (air = 1):	Not determined
Boiling Point (°C):	Not determined
Solubility in Water:	Soluble
% Volatile:	Not applicable
pH:	1-2
Density:	Not determined
Freezing Point:	Not determined

4: Flammability and Fire Fighting Measures

Flammability: Not flammable
Flash Point (°C): Not applicable
Upper flammable Limit (% by volume): Not applicable
Lower flammable Limit (% by volume): Not applicable
Autoignition Temperature ("C): Not applicable
Hazardous Combustion Products: if involved in a fire may produce hydrogen chloride gas
Sensitivity to Static Discharge: No
Means of Extinction: If involved in a fire use extinguishing media suitable to other materials involved in the fire, such as dry chemical, waterjet, carbon dioxide or alcohol foam

Special Procedures:

If large volumes are involved in a fire self contained breathing apparatus should be worn.

5. Reactivity

Chemical Stability: Stable under normal conditions of use
Incompatibilities: Strong oxidisers, strong alkalis, metals metal oxides alkali metals amines copper and its alloys, aluminium, iron, fluorine zinc acetic anhydride vinyl acetate, chlorinated hydrocarbons, propylene oxide

Hazardous Decomposition Products: Hydrogen chloride, chlorine, hydrogen gas
Hazardous Polymerization: Will not occur
Conditions to Avoid: Incompatible products

6. Toxicology / Hazard Identification and Health Data

Route of Entry Skin Contact: Yes
Route of Entry Eye Contact: Yes
Route of Entry inhalation Acute: Yes
Route of Entry inhalation Chronic: No
Route of Entry ingestion: Yes
Reproductive Effects: None known
Mutagenicity: None known
Teratogenicity: None known

Carcinogenicity:	None known
Synergenistic Materials:	None known
Sensitization to Product:	With extended use and exposure some individuals may become sensitised to the Product.
Exposure Limits:	Hydrochloric acid: 5 ppm ceiling (OSHA)
Irritancy of Product:	May cause irritation with prolonged use
LD 50 LC 50/SPecies/Route:	Hydrochloric acid: LC50 1108 ppm/1H (inhalation Rat) LD50: 900 mg/kg (Oral, rabbit)
Effects of Chronic Exposure:	Prolonged skin contact may cause dermatitis. Prolonged inhalation may cause erosion of the teeth. Prolonged Exposure of the eyes may cause conjunctivitis, photosensitisation and blindness
Effects of Acute Exposure:	May cause severe irritation of the mucous membranes if inhaled or ingested. Contact with eyes will cause irritation and possibly burns.

7. Personal Protection / Exposure Controls

Personal Protective Equipment:	Under normal conditions of use eye protection and gloves should be worn
Gloves (Specify):	Chemical resistant
Respirator (Specify):	If large volumes of airborne vapours are being generated, an air purifying respirator fitted with acid vapour cartridges should be worn
Eyes (Specify):	Goggles or glasses
Footwear (Specify):	Wear appropriate footwear for work location
Clothing (Specify):	Wear appropriate clothing for work location
Other (Specify):	No other special protective wear should be required for the use of this product
Engineering Controls:	Local exhaust ventilation if used indoors
Leak and Spill Procedure:	Soak up large volumes of the material with absorbent, pack in appropriate containers for disposal at approved waste disposal facility, in accordance with local, provincial and federal regulations. Do not allow to enter surface water system. Wash away residue with detergent and water.
Waste Disposal:	In accordance with local, provincial and federal regulations.

Handling Procedures and Equipment:	Handle with care, do not eat, drink or smoke in areas where product is being used. Employ good house keeping procedures.
Storage Requirements:	Store in dry, cool areas
Special Shipping information:	TDG - UN 1789, Class 8, pg. 11

8. First Aid Measures

Skin:	Wash contaminated area with copious amounts of water. If irritation persists, seek medical attention.
Eyes:	Flush with clean water for 15 minutes. Seek medical attention immediately.
ingestion:	Drink several glasses of water and seek medical attention. Do not induce vomiting.
inhalation:	Remove individual to fresh air. If breathing problems persist seek immediate medical attention, perform CPR if victim is not breathing.
General Advice:	Keep out of the reach of children. Employ good housekeeping practices, do not eat drink or smoke where chemicals are being used.

Note to reader:
Tallman Geological Consulting Ltd. provides this information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a trained person. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose. Tallman Geological Consulting Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. Tallman Geological Consulting Ltd. will not be responsible for damages resulting from use or reliance upon this information.

KWIKLEEN

1. IDENTIFICATION

F & G SPECIALT CHEMICALS LTD.
18, 3716 - 56 Avenue SE
Calgary, Alberta T2C 2B5
Product name: **KWIKLEEN**
Other name:
Distributed by:

phone: (403)279 3814
In Case of Emergency Only:
phone CANUTEC at (613) 996-6666
Code: J446

Product use: degreaser
Date completed: September 1, 2009

2. **COMPOSITION/INFORMATION ON INGREDIENTS**

Ingredient	%W/W	CAS number
Ethylene glycol monobutyl ether	3-7	111-76-2

3. **HAZARDS IDENTIFICATION**

Eye irritant. Harmful if swallowed.

4. **FIRST AID MEASURES**

inhalation: Remove from exposure. Get fresh air.
Ingestion: induce vomiting only on the direct advice of a poison control centre. Get medical attention.
Eye contact: Flush with plenty of water for at least 15 minutes. Get medical attention.
Skin contact: Remove contaminated clothing and flush with plenty of water.

5. **FIRE. FIGHTING MEASURES**

Flash point (test method): Not applicable
Flammable limits (%): Non-flammable
Lower: Not applicable
Upper: Not applicable

Fire extinguishing substances: Use extinguishing media appropriate for surrounding fire.
Autoignition temperatures: Not applicable
Hazardous combustion products: May liberate carbon monoxide, carbon dioxide and oxides of sodium.
Explosion data:
Sensitivity to mechanical impact: Not applicable
Sensitivity to static discharge: Not applicable
Special fire fighting procedures: As for surrounding fire.

6. **ACCIDENTAL RELEASE MEASURES**

Personal precautions: Wear appropriate protective equipment.
Environmental precautions: Prevent from entering sewers, waterways or low areas.

Methods for cleaning up: isolate hazard area and restrict access. Small spills: soak up with inert absorbent material and scoop into containers. Large spills: prevent contamination of waterways. Dike and pump into suitable containers. Clean up residual with absorbent material, place in appropriate container and flush with water.

7. **HANDLING AND STORAGE**

Handling: Do not ingest. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
Storage: Keep out of reach of children. Keep container tightly closed. Store in a cool, dry area.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: Special ventilation requirements not normally necessary
Respiratory protection: If exposure exceeds occupational exposure limits, use an appropriate NIOSH approved respirator
Eye protection: Chemical goggles. Wear a face shield if splashing hazards exists.
Other protection: Wear protective clothing as necessary to prevent skin contact.

Exposure limits:

INGREDIENT	ACGIH	OSHA	Other
Ethylene glycol monobutyl ether	20 ppm TWA	Not available	

9. **PHYSICAL AND CHEMICAL PROPERTIES**

Physical state: Liquid Solubility in water: Complete
Boiling point: 100C Vapour pressure: Not available
Vapour density: Not available Evaporation rate: Not available
Freezing point: Not available Odour threshold: Not available
Sp. Gravity: 1 .037 pH: 10.6
Appearance & odour: blue liquid with butyl odour

10. **STABILITY AND REACTIVITY**

Stability: Stable
Conditions of instability: Not available
Incompatibility: ( ) Water (X) Oxidizers (X) Acid ( ) Base ( ) Other

Conditions of reactivity: Not available
Hazardous decomposition products: Not available

11. **TOXICOLOGICAL PROPERTIES**
POTENTIAL ACUTE HEALTH EFFECTS

inhalation: Irritating to respiratory system.
ingestion: Swallowing small amounts of this material is not likely to cause harmful effects. Large
amounts may cause stomach and intestinal irritation, abdominal pain and vomiting.
Eye contact: May cause mild to severe irritation such as stinging, tearing, redness and swelling of the eyes.
Skin contact: May cause skin irritation.
Skin absorption: Not available

POTENTIAL CHRONIC HEALTH EFFECTS:

inhalation: Repeat or prolonged exposure may cause damage to lungs.
ingestion: Not available
Eye contact: Not available
Skin contact: Not available
Skin absorption: Not available
Prolonged overexposure to high concentrations of ethylene glycol monobutyl ether by absorption, ingestion and inhalation has caused blood, liver and kidney effects in laboratory
animals.
Irritancy of product: See WHMIS criteria
Sensitization of product: Not available
Carcinogenicity: IARC (1 ,2A or 28) No known significant effects.
ACGIH: (A1, A2 or A3) No known significant effects.
Reproductive toxicity: No known significant effects.
Teratogenicity: No known significant effects.
Mutagenicity: No known significant effects.
Synergistic product: Not available

HAZARDOUS INGREDIENTS	CAS NO.	TOXICITY DATA
Ethylene glycol monobutyl ether	111-76-2	LD50 oral (rat) 1480 mg/kg LD50 Dermal(rabbit) 630 mg/kg

12. **EGOLOGICAL INFORMATION**
Ecotoxicological information: Not available
Other information:

13. **DISPOSAL CONSIDERATIONS**
Waste disposal: Disposal of all waste must be done according to local, provincial and federal regulations.

14. **TRANSPORT IN FORMATION**
TDG classification: Not regulated

15. **REGULATORY INFORMATION**
WHMIS: D2B Other toxic effects
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations
(CPR) and the MSDS contains all the information required by the CPR.

16**. PREPARATION INFORMATION**
Prepared by: Technical Services Department, F & G Specialty Chemicals Ltd. (403) 279-3814

Note to reader:
Tallman Geological Consulting Ltd. provides this information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a trained person. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose. Tallman Geological Consulting Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. Tallman Geological Consulting Ltd. will not be responsible for damages resulting from use or reliance upon this information.

Alizarin Red S Solution

PETROCRAFT PRODUCTS LTD.
Bay C. 2410 2nd Avenue, SE,
Calgary, AB, T2E 6J9
(403) 272-9590 Fax (403)248-7999

PRODUCT NAME: Alizarin Red S Solution
WHMIS CODES: D2B

In Case of Emergency Only.
Phone CANUTEC (613)996-6666

Product Identification

Chemical Name: Alizarin Red S
Chemical Family: Anthraquinone dye
Chemical Formula: C14H7O7SNa
Molecular Weight: 342.26
Trade Name-Synonym: Mordant Red 3

Composition / Ingredients

HAZARDOUS INGREDIENT	%WT/WT	CAS NUMBER	TOXICITY DATA	EXPOSURE LIMITS
Alizarin Red S	<1%	130-22-33	None established	None established.

Physical Data

Physical State: Liquid
Odour and Appearance: Brown/ red liquid, with sharp odour
Odour Threshold (PPM): No data
Specific Gravity: Not determined
Vapour Pressure (mm Hg) Not determined
Vapour Density (at = 1). Not determined
Boiling Point (C): Not determined
Solubility in Water. Soluble
% Volatile. Not applicable
pH: 3
Density. Not determined
Freezing Point: Not determined

Flammability and Fire Fighting Measures

Flammability: Not flammable
Flash Point ('C): Not applicable
Upper Flammable Limit (7o by volume): Not applicable
Lower Flammable Limit (% by volume): Not applicable
Auto-ignition Temperature ("C): Not applicable
Hazardous Combustion Products: If involved in a fire may produce oxides of carbon and sulphur, also hydrogen chloride gas
Sensitivity to Static Discharge: No

Means of Extinction: If involved in a fire use extinguishing media suitable to other materials involved in the fire such as dry chemical, water jet. carbon dioxide or alcohol foam
Special Procedures: If large volumes are involved in a fire self contained breathing apparatus should be worn

Reactivity - -

Chemical Stability: Stable under normal conditions of use
Incompatibilities: Strong oxidiser, reducing agent
Hazardous Polymerization: Will not occur
Hazardous Decomposition Products: If involved in a fire may produce oxides of carbon and sulphur, also hydrogen chloride gas
Conditions to Avoid: Incompatible products Protect from light Excessive temperatures and heat

Toxicology, Hazard Identification and Health Data

Route of Entry Skin Contact Yes
Route of Entry Eye Contact: Yes
Route of Entry inhalation Acute: Yes
Route of Entry Inhalation Chronic: No
Route of Entry ingestion: Yes
Reproductive Effects: None known
Mutagenicity: None known
Teratogenicity None known
Carcinogenicity: None known
Synergenistic Materials: None known
Sensitization to Product: With extended use and exposure some individuals may become sensitised to the product
Exposure Limits: Not established
Irritancy of Product: May cause irritation with prolonged use
LD 50 LC 50/Species/Route: Not established

Effects of Chronic Exposure: None known

Effects of Acute Exposure: May cause irritation of the mucous membranes if inhaled, ingested. Contact with eyes will cause irritation

Personal Protection / Exposure Controls

Personal Protective Equipment: Under normal conditions of use eye protection and gloves should be worn
Gloves {Specify}: Chemical resistant
Respirator (Specify). If large volumes of airborne vapours are being generated, an air purifying respirator fitted with acid vapour cartridges should be worn
Eyes specify: Goggles or glasses
Footwear (Specify). Wear appropriate footwear for work location
Clothing specify): Wear appropriate clothing for work location
Other specify): No other special protective wear should be required for the use of this product.
Engineering Controls: Local exhaust ventilation if used indoors
Leak and Spill Procedure Soak up large volumes of the material with absorbent. packing appropriate containers for disposal at approved waste disposal facility, run accordance with local, provincial and federal regulations. Do not allow to enter surface water system. Wash away residues with detergent and water.
Waste Disposal: In accordance with local, provincial and federal regulations.
Handling Procedures and Equipment: Handle with care, do not eat, drink or smoke in areas where product is being used. Employ good house keeping procedures.
Storage Requirements: Store in dry, cool areas
Special Shipping Information: Not regulated for TDG

FIRST AID MEASURES

Skin: Wash contaminated area with copious amounts of water. If irritation persists
seek medical attention.
Eyes: Flush with clean water for 15 minutes. Seek medical attention immediately. Ingestion: Drink several glasses of water and seek medical attention. Do not induce vomiting.
Inhalation: Remove individual to fresh air. If breathing problems persist seek immediate medical attention, perform CPR if victim is not breathing.
General Advice: Keep out of the reach of children. Employ good housekeeping practices, do not eat drink or smoke where chemicals are being used.

OTHER INFORMATION

Flammability: 0 Health: 1
Reactivity: 0 Personal Protection: 1

Preparation Date of M.S.D.S. / Disclaimer

Prepared by Technical Service Dept., Petrocraft Products Ltd.
(403)272-9590
Date: October 6. 2009 Revised: January 30, 2009

Note to reader:
Tallman Geological Consulting Ltd. provides this information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a trained person. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose. Tallman Geological Consulting Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. Tallman Geological Consulting Ltd. will not be responsible for damages resulting from use or reliance upon this information.

Tritiated Water

RADIONUCLIDE SAFETY DATA SHEET

1/1/2008

IDENTIFICATION

Product Name **Tritiated Water**

Appearance	Colorless Liquid
Odor	None
Synonyms	Tritium, H30
Radionuclide	3H
Chemical Form	3H20

COMPANY INFORMATION

ProTechnics
6316 Windfern
Houston, Texas 77040
PHONE: (1) 713-320-2320
24 HOUR EMERGENCY RESPONSE: (Within US) 1 800 535 5053
(Outside US) 1 352 323 3500 Collect

HAZARDS IDENTIFICATION

LABEL PRECAUTIONARY STATEMENTS

INHALE	LOW LEVEL RADIATION EXPOSURE
SKIN	LOW LEVEL RADIATION EXPOSURE
EYES	LOW LEVEL RADIATION EXPOSURE
INGEST	LOW LEVEL RADIATION EXPOSURE

FIRST AID MEASURES

If swallowed, obtain competent medical attention immediately. The physician should be qualified in Nuclear Medicine and/or Health Physics. Forcing fluids (3 -4 liters per day) through the body will reduce contamination. In case of Skin contact, wash area thoroughly with water. In case of Eye contact, flush with copious amounts of water for at least 15 minutes. Assure that adequate flushing occurs by separating eyelids with fingers. Obtain an immediate urine sample. Collect urine sample every 24 hours until qualified individual instructs otherwise.

FIRE FIGHTING MEASURES

Wear self contained breathing apparatus.
Protective clothing including rubber gloves and impervious rubber boots.
No unusual fire or explosive hazards.

ACCIDENTIAL RELEASE MEASURES

Wear respiratory protection (if in concentrated form), protective clothing, chemical safety goggles, impervious boots, and rubber gloves.
Clean up spill area using absorbent material and transfer to a lined drum for disposal as **RADIOACTIVE WASTE**.
It may be necessary to remove earth or other contaminated material to a lined drum for disposal as.
RADIOACTIVE WASTE.
Remove all contaminated clothing and place in plastic bags for disposal as **RADIOACTIVE WASTE**.
Perform wipe survey of area and analyze by liquid scintillation.

HANDLING and STORAGE

No precautions except observance of all precedents attendant to use of Radioactive materials.

EXPOSURE CONTROLS and PERSONNEL PROECTION

Cannot detect 3H using G-M or NaI survey meters.
Whole Body TLD Badge not required.
Finger TLD Rings not required.
Wear respiratory protection, protective clothing, chemical safety goggles, impervious boots, and rubber gloves.

PHYSICAL PROPERTIES

Boiling Point 100 OC
Vapor Pressure N/A
Vapor Density (Air = 1.0)

Specific Gravity 1.00
Evaporative Rate N/A
Solubility in Water N/A

RADIOLOGICAL PROPERTIES
Critical Organ Body Water or Tissue
Beta Energy
Maximum 18.6 KeV
Average 5.7 KeV
Maximum Beta Range
In Air 6.0 mm
In Water 0.006 mm
In Tissue Insignificant (Stopped by dead layer of outer skin.)
Specific Activity 9640 Ci/gm
Half-Life
Physical 12.3 years
Biological 10 - 12 days (Following ingestion)
Effective 10 - 12 days (Physical & Biological Combined)
Forced 5 - 6 days (Forcing fluids through body)
Committed Dose Equivalent (CDE)
Ingested 64.0 mRem/mCi
Inhaled 64.0 mRem/mCi
Puncture 64.0 mRem/mCi
Committed Effective Dose Equivalent (CEDE)
Ingested 90.0 mRem/mCi
Inhaled 63.0 mRem/mCi
Annual Limit on Intake (as 3H2O)
Ingested 80.0 mCi
Inhaled 80.0 mCi

STABILITY and REACTIVITY
Stability Stable
Conditions To Avoid None
ProTechnics (403) 269-2055 3 of 3 RSDS_Tritium_2008
Incompatibilities Alkali Metals
Hazardous Combustion Products Tritium Gas
Hazardous Decomposition Products Tritium Gas
Hazardous Polymerizations None

TOXOLOGICAL INFORMATION
Health effects in man have not been reported from single acute exposures to Tritium.
Avoid inhaling vapors or allowing skin contact.
May cause Eye and Mucous membrane irritation.

TRANSPORT INFORMATION
DOT PSN Code UN2910
DOT PSN Radioactive Material, Excepted Package Limited Quantity of Material
IMO PSN Code UN2910
IMO PSN Radioactive Material, Excepted Package Limited Quantity of Material
IATA PSN Code UN2910
IATA PSN Radioactive Material, Excepted Package Limited Quantity

REGULATORY COMPLIANCE INFORMATION
Derived Air Concentration 2.0 x 10-5 uCi/ml
Airborne Effluent Release Limit 1.0 x 10-7 uCi/ml
Controlled Area Removable Contamination Limit 2,200 dpm/100 cm2
Bioassay Required for Handled Amounts > 100 mCi

LABELING DATA
Label Required Yes
Common Name Tritiated Water

SPECIAL HAZARD PRECAUTIONS
INHALE - LOW LEVEL RADIATION EXPOSURE
SKIN - LOW LEVEL RADIATION EXPOSURE
EYES - LOW LEVEL RADIATION EXPOSURE
INGESTION - LOW LEVEL RADIATION EXPOSURE

Note to reader:
Tallman Geological Consulting Ltd. provides this information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a trained person. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose. Tallman Geological Consulting Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. Tallman Geological Consulting Ltd. will not be responsible for damages resulting from use or reliance upon this information.

Material Safety Data Sheets

Material Safety Data Sheet

PETROCRAFT PRODUCTS
Bay C, 2410 2nd Avenue, SE,

Calgary, AB, T2E 6J9
(403)272-9590 Fax (403)248-7999

PRODUGT NAME:

WHMIS GODES:

LTD.

BARIUM CHLORIDE

D1B

In Case of Emergency Only:
Phone CANUTEC: (61 3)996-6666

PRODUCT IDE

Chemical Name:
Chemical Family:
Chemical Formula:
Molecular Weight:
Trade Name-Synonym:

Barium chloride solution
Barium chloride
$BaCl_2.2H_2O$
208.24
Barium chloride

COMPOSITION / INGREDIENT

HAZRDOUS INGREDIENT

%wT twT

EXPOSURE LIMITS

Barium chloride dihydrate

1 - 10

10326-27-9

None established

Exposure limits for Barium (soluble compounds) = 0.5 mg/m3 TWA (OSHA vacated PEL's)

Toxicity data for Barium chloride anhydrous = LD50: 118 mg/kg (Oral, rat)

PHYSICAL

Physical State:	Liquid
Odour and Appearance:	Clear, colourless liquid
Odour Threshold (PPM):	No data
Specific Gravity	Not determined
Vapour Pressure (mm Hg):	Not determined
Vapour Density (air = 1):	Not determined
Boiling Point ("C):	Not determined
Solubility in Water:	Soluble
'/o Volatile:	Not applicable
pH	3
Density:	Not determined
Freezing Point:	Not determined

4: FLAMMABILITY AND

FIRE Fighting MEASURES

Flammability:
Flash Point ("C):
Upper Flammable Limit (% by volume):
Lower Flammable Limit (o/o by volume):
Autoignition Temperature ("C):
Hazardous Combustion Products:

Sensitivity to Static Discharge:
Means of Extinction:

Special Procedures:

Not flammable
Not applicable
Not applicable
Not applicable
Not applicable
If involved in a fire may produce oxides of carbon and sulphur, hydrogen chloride gas
No
If involved in a fire use extinguishing media suitable to other materials involved in the fire, such as dry chemical, water jet, carbon dioxide or alcohol foam
If large volumes are involved in a fire self contained breathing apparatus should be worn

Chemical Stability:
incompatibilities:

Hazardous Decomposition Products:

Hazardous Polymerization:
Conditions to Avoid:

Stable under normal conditions of use
Strong oxidisers, bromine trifluoride, 2-furan percarboxylic acid (explodes at room temperature, will react violently with sulphuric acid
If involved in a fire may produce oxides of carbon and sulphur, also hydrogen chloride gas
Will not occur
incompatible products

TOXTCOLY / HAZARD INDENTIFICATION AND HEM

Route of Entry Skin Contact:
Route of Entry Eye Contact:
Route of Entry inhalation Acute:
Route of Entry inhalation Chronic:
Route of Entry ingestion:
Reproductive Effects:
Mutagenicity:
Teratogenicity:
Carcinogenic$:
Synergenistic Materials:
Sensitization to Product:

Exposure Limits:

irritancy of Product:
LD 50 LC 50/Species/Route:
Effects of Chronic Exposure:

Effects of Acute Exposure:

Yes
yes
Yes
No
Yes
None known
None known
None known
Not classified as a Human Carcinogen
None known
With extended use and exposure some individuals may become sensitised to the product
Exposure limits for Barium (soluble compounds) = 0.5 mg/m3 TWA (OSHA vacated PEL's)
May cause irritation with prolonged use
Toxicity data for Barium chloride anhydrous = LD50: 118 mg/kg (Oral, rat)
Long term exposure may cause concentration of toxic material in target organs - kidneys, respiratory system, muscles and cardio-vascular system
Eyes: irritation, burning pain, conjunctivitis. Skin: irritation and possibly

necrosis. ingestion: May cause kidney damage, severe digestive tract irritation, nausea, vomiting and diarrhoea, may cause digestive tract haemorrhaging. Barium chloride can seriously affect the smooth muscles of the cardiovascular and respiratory systems, numbness and tingling of the mouth and face, convulsions, paralysis, respiratory failure, slow pulse and pulmonary oedema and irregular heartbeat.

PERSONAL PROTECTION / EXPOSURE

ONTROLS

Personal Protective Equipment:
Gloves (Specify):
Respirator (Specify):

Eyes (Specify):
Footwear (Specify):
Clothing (Specify):
Other (Specify):

Engineering Controls:
Leak and Spill Procedure:

Waste Disposal:
Handling Procedures and Equipment:

Storage Requirements:
Special Shipping information:

Under normal conditions of use eye protection and gloves should be worn
Chemical resistant
If large volumes of airborne vapours are being generated, an air purifying respirator fitted with acid vapour cartridges should be worn
Goggles or glasses
Wear appropriate footwear for work location
Wear appropriate clothing for work location
No other special protective wear should be required for the use of this product
Local exhaust ventilation if used indoors
Soak up large volumes of the material with absorbent, pack in appropriate containers for disposal at approved waste disposal facility, in accordance with local, provincial and federal regulations. Do not allow to enter surface

water system. Wash away residues with detergent and water.
In accordance with local, provincial and federal regulations.
Handle with care, do not eat, drink or smoke in areas where product is being used. Employ good house keeping procedures.
Store in dry, cool areas
TDG - Barium Compound N.O, S. (Barium chloride), UN 1564, Class 6.1, PG II

FIRST AID MEASURE

Skin:

Eyes:
ingestion:

inhalation:

General Advice:

9. OTHER INFORMATION

Wash contaminated area with copious amounts of water. If irritation persists seek medical attention.
Flush with clean water for 15 minutes. Seek medical attention immediately.
Drink several glasses of water and seek medical attention. Do not induce vomiting.
Remove individual to fresh air. If breathing problems persist seek immediate medical attention perform CPR if victim is not breathing.
Keep out of the reach of children. Employ good housekeeping practices, do not eat drink or smoke where chemicals are being used.

Flammability:
Reactivity:

Health: 2
Personal Protection:

Notice to reader
Tallman Geological Consulting Ltd. provides this information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the

material by a trained person. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose. Tallman Geological Consulting Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided. Tallman Geological Consulting Ltd. will not be responsible for damages resulting from use or reliance upon this information.