CONTROLTECH

INSTRUMENTATION + ELECTRICAL

SAFE WORK PRACTICES

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HEALTH & SAFETY MANAGEMENT SYSTEM CHANGE REGISTER			
PAGE(S) AMENDED	REASON FOR CHANGE	DATE OF REVISION	AUTHORIZED BY

TERMS AND DEFINITIONS

Action level - Term used by OHS (Occupational Health & Safety) and NIOSH (The National Institute for Occupational Safety and Health) to express the level of toxicant which requires medical surveillance, usually one half the PEL.

ACGIH - the American Conference of Governmental Industrial Hygienists publication entitled Threshold Limit Values and Biological Exposure Indices, dated 2002, as amended from time to time.

Administrative Controls - Processes developed by Control Tech to control hazards not eliminated by engineering controls (e.g. safe work policies, practices and procedures, job scheduling or rotation and training).

Air-purifying respirator – Respirators that use filters or sorbents to remove harmful substances from the air.

Air-supplied respirator – Respirator that provides a supply of breathable air from a clean source outside of the contaminated work area.

ANSI – The American National Standards Institute develops consensus standards nationally for a wide variety of devices and procedures.

Asphyxia – Suffocation from the lack of oxygen.

Atmospheric pressure – The pressure exerted in all directions by the atmosphere.

Audible range – The frequency range over which normal ears hear – approximately 20Hz through 20,000 Hz.

Audit - An evaluation of an organization's Health and Safety Management System against an approved standard.

Audit program - A set of one or more audits planned for a specific time frame and directed towards a specific purpose. Note: An audit program includes all activities necessary for planning, organizing and conducting the audits.

Biohazard - Biological hazard. Organisms or products of organisms that present a risk to humans, i.e., blood, body fluids.

Caustic - Something that strongly irritates, burns, corrodes or destroys living tissue.

Chemical cartridge - The type of absorption unit used with a respirator for removal of low concentrations of specific vapors and gases.

Chronic - Persistent, prolonged, repeated.

Combustible liquids - Those liquids having a flash point at or above 37.8C (100F).

Competent Worker - A person who is adequately qualified, suitably trained and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Continual Improvement - Always striving to innovate, implement and improve on current conditions.

Contractor - An individual or employer hired under contract to provide materials or services to another individual or employer.

Corrosive - A substance that causes visible destruction or permanent changes in human skin tissue at the site of contact.

Critical Job - A job with high potential for serious loss or injury.

CSA – Canadian Standards Association

Danger - Any hazard, condition or activity that could reasonably be expected to be an imminent or serious threat to the life or health of a person exposed to it before the hazard or condition can be corrected or the activity altered.

Decibel (dB) - A unit used to express sound power level.

Document - A medium containing information related to the health and safety management system.

Engineering Controls - Preferred method of hazard control if elimination is not possible; physical controls implemented at the design, installation, or engineering stages (e.g. guards, auto shutoff, etc.).

Flammable limits – The lower flammable limit (LFL or LEL) is the minimum concentration below which propagation of a flame does not occur. The upper flammable limit (UFL or UEL) is the maximum concentration above which propagation of a flame does not occur. Usually expressed in percentages.

Flammable liquid – Any liquid having a flash point below 37.8C (100F).

Flash point – The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture with air and produce a flame in the presence of an ignition source.

Fume – Airborne particulate formed by the evaporation of solid materials, i.e., metal fume emitted during welding.

Health Hazard - a physical, chemical, biological, or psychological hazard which may cause acute or chronic health effects in exposed workers (e.g. noise, dust, heat, ergonomics, etc.).

Hazard - A situation, condition, or behaviour that has the potential to cause an injury or loss.

Hazard Assessment - A process used to identify and evaluate the health and safety hazards associated with job tasks and provides a method for prioritizing health and safety hazards.

Hazard Control - Method used to eliminate or control loss

Hazard Information – pertaining to a hazardous substance is information on the proper and safe storage, handling, use and disposal of the hazardous substance, including information relating to its toxicological properties

Hazardous material – Any substance or compound that has the capability of producing adverse effects on the health and safety of humans.

Hearing conservation – The prevention or minimizing of noise induced deafness through the use of hearing protection and control methods.

Heat stress – Relative amount of thermal strain from the environment.

IDLH – Immediately Dangerous to Life or Health.

Imminent Danger - danger about to happen, or threatening to happen in relation to an occupation.

Incident (Accident) - A preventable, undesired and unexpected event that results, or has the potential to result, in physical harm to a person or damage to property (loss or no loss).

Inspection - A planned, systematic audit or examination of an activity or work site, checking or testing against established standards.

Inspector - Qualified person designated by Control Tech to conduct inspections.

Job Inventory - A comprehensive list of jobs/tasks produced from a systematic review of all jobs/tasks in the work area.

Legislation - Provincial, federal, or other government standards in the form of written acts, regulations and codes.

Manager - A person who administers and/or supervises the affairs of a business, office, or organization.

Mixture – A combination of two or more substances that may be separated by mechanical means.

Near Miss - An undesired event that under slightly different circumstances could have resulted in personal harm, property damage or loss. Also referred to as an incident.

NIOSH – The National Institute for Occupational Safety and Health is a federal agency. It conducts research on health and safety concerns and trains occupational health and safety professionals.

PEL – Permissible Exposure Limit. An exposure limit that is published and enforced by OHS as a legal standard.

Personal Protective Equipment (PPE) - Equipment used or clothing worn by a person for protection from health or safety hazards associated with conditions at a work site (e.g. hardhat gloves, coveralls, steel toed boots, ear plugs, safety glasses, fall protection, etc.). Used when engineering or administrative methods cannot fully control the hazards.

Policy - The documented principles by which Control Tech is guided in its management of affairs.

Procedure - A documented method to carry out an activity.

Readily Available - means present in an appropriate place in a physical copy form that can be handled

Record - A document that states results achieved or provides evidence of activities performed.

Risk - The chance of injury, damage or loss.

Root Cause - The underlying or basic factors which contribute to an incident.

Safety Hazard - a substance, process, action, or condition which may endanger the immediate safety of workers (e.g. chemical burns, shear points, slips and falls, etc.).

Safe Work/Safe Job Procedure - A written, step-by-step instruction of how to perform a task from beginning to end.

SDS –Safety Data Sheet.

SLPP-Safety Loss and Prevention Program

System - A set of inter-related or interacting elements.

Unsafe Act - Inappropriate action taken by a person that could result in loss.

Unsafe Condition - A condition that could result in loss.

Visitor - Any person present at the work site that is not under the direct control of Control Tech (e.g. courier).

Work Site - 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.

SAFE WORK PRACTICES, PROCEDURES & PERMITTING

All work exposes the worker to some degree of hazard. This degree of hazard determines the type of safeguards required to protect the worker. Most routine work has defined safe work practices or procedures. Safe work permits are used where safe work practices and safe job procedures are absent or may be insufficient due to changes in circumstances or environment.

Control Tech develops and enforces the use of practices, procedures and permits for conducting a task safely.

A review process has been set up to be completed annually to allow for the practices and procedures to be updated when required.

Control Tech Safe Work Practices and Safe Job Procedures represent the company's list of identified Critical Tasks.

SAFE WORK PRACTICES

Safe Work Practices are generally written methods outlining how to perform a task with minimum risk to people, equipment, materials, environment, and processes.

Safe work practices are developed from the hazard assessments and closely reflect the activities most common in the Control Tech activities. All safe work practices should be kept on site where work is being performed and readily available to the workers.

A review process has been set up to be completed annually to allow for the practices to be updated when required.

Control Tech Safe Work Practices are in place to ensure that worker carrying out specific tasks have the least possible chance of exposure to hazards.

Following Safe Work Practices minimize identified hazards when performing a task.

It is the responsibility of all employees to control and report any unsafe conditions or practices that may be observed. All such conditions or practices will be reported to the supervisor without delay.

Safe Work Practices shall be designed to address tasks both routine and extraordinary performed by employees and will be available for them to familiarize themselves with.

Employee participation is encouraged and recommended in the completion of these practices. Control Tech realizes the value of these policies in the prevention of accidents/incidents before they occur.

Safe Work Practices will exceed regulatory requirements wherever practical and shall be revised periodically to reflect relevant standards.

It shall remain the responsibility of the supervisor to ensure that all employees comply with this policy and actively participate in communicating the information to employees.

The supervisor in association with upper management, and the safety coordinator, will develop new work practices as are necessary to ensure the safety and well-being of the workers.

It is and shall remain the responsibility of the employee to be familiar with the Safe Work Practices associated with the work being performed, and to conform to the practices as set forth in this manual.

Employees are encouraged to submit their practical experienced-based ideas to their supervisors for review.

This information will be used to update the practices currently in place and will prove invaluable in implementing new innovations developed as the result of an individual experience working with particular tools and specific processes.

Control Tech Safe Work Practices and Safe Job Procedures represent the company's list of identified Critical Tasks.

SAFE JOB PROCEDURES

Safe Job Procedures are a series of specific steps that guide a worker through a task from start to finish in a chronological order thereby reducing the risk by minimizing potential exposure.

Safe job procedures are developed by management and workers as a result of a hazard assessment, accident investigation and/or as a supplement to a safe work practice.

Safe work procedures are included in Control Tech's "Worker Orientation" program. All workers should be aware that safe job procedures have been established, are in effect, are written down and must be followed. Procedures are available onsite to ensure workers have access.

A review process has been set up to be completed annually to allow for the practices to be updated when required.

Control Tech Safe Job Procedures are in place to ensure that workers carrying out specific jobs or tasks have the least possible chance of exposure to hazards.

The stages in developing Safe Job Procedure are identifying/selecting the job to analyzed, breaking the job down in a sequence of basic steps, identifying potential hazards in each step, and determining preventative measures to overcome these hazards.

Employee participation is encouraged and recommended in the completion of these procedures. Control Tech realizes the value of these policies in the prevention of accidents/incidents before they occur. Safe Job Procedures will exceed regulatory requirements wherever practical and shall be revised periodically to reflect relevant standards.

It shall remain the responsibility of the supervisor to ensure that all employees comply with this policy and actively participate in communicating the information by making these procedures part of the regularly scheduled Safety Meetings and Toolbox Meetings.

The supervisor in association with upper management, and the Safety Coordinator, will develop such new work procedures as are necessary to ensure the safety and well-being of the workers for whom he is responsible.

It is and shall remain the responsibility of the employee to be familiar with the Safe Job Procedures associated with the work he/she is to perform, and to conform to the procedures as set forth in this manual.

Employees are encouraged to submit their practical experienced-based ideas to their supervisors for review. This information will be used to update the procedures currently in place and will prove invaluable in implementing new innovations developed as the result of an individual experience working with particular tools and specific processes.

Employees will be responsible for following all procedures required for the work assigned for his/her own protection.

It is the responsibility of all employees to control and report any unsafe conditions or practices that may be observed. All such conditions or practices will be reported to the supervisor without delay.

SAFE WORK PERMITTING

Verbal instructions can be misinterpreted or forgotten, whereas more control is achieved through the use of safe work practices or safe work permits. The safe work permit helps to identify and control hazards, but does not, by itself, make the job safe.

All workers of Control Tech using permits must completely understand the reasons for, and the requirements of, the permit before work begins. All workers should be aware of which jobs require safe work permits and the safe work permits must be followed. Safe work permits are included in Control Tech's "Worker Orientation" program and the workers involved in the permitting process will be trained in the process and its requirements.

A safe work permit is a written record that authorizes specific work, at a specific work location, for a specific time period. Permits are used for controlling and co-ordinating work to establish and maintain safe working conditions.

They ensure that all foreseeable hazards have been considered and that the appropriate precautions are defined and carried out in the correct sequence.

The permit is an agreement between the issuer and the receiver that documents the conditions, preparations, precautions, and limitations that need to be clearly understood before work begins. The permit issuer must be sure that the work situation identified on the permit is as described.

A safe work permit should only be issued by a competent person who is completely familiar with the work or situation covered by the permit and who has control over changes in that work area e.g. lead operator or supervisor.

The permit issuer should review the work or operation with the worker(s) before work begins. The person receiving the permit must completely understand the work situation, the potential hazards, and the precautions required before accepting the permit and the permit issuer must be sure that the worker understands the hazards.

No one should sign a safe work permit unless completely satisfied that the work can be done safely.

Control Tech requires that all safe work permits be signed by both the permit receiver and the permit issuer before work is started and again when it is completed.

Safe work permits should be made out in duplicate where one copy is retained by the issuer at the work site and the other is held by the worker(s) doing the work. Safe work permits must be available onsite to ensure workers have access. Permits are to be returned to the issuer when work is completed or at end of shift if work is not completed.

Each type of permit provides a checklist for the person preparing the equipment, informs workers carrying out the work of the hazards present, lists or describes the precautions to be taken, and describes the personal protective equipment to be worn by workers.

The permit should record 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 safety complete the work.

Safe Work Permits are used in the absence of safe work practices or safe job procedures or where circumstances or environment may change for a specific job being conducted or the transfer of hazardous work from one work shift to the next.

Examples of when Safe Work Permits are used:

- Lockout Permit – when the control of energy is required such as maintenance &/or repair work being completed and the risk of equipment and machine starting unexpectedly or electrical work is being completed and the power source may unexpectedly be turned on. (Exposure to high voltage electrical equipment)
- Confined space Permit - when entering any confined space such as a tank, vessel, tower, pit or sewer. Where there is potential exposure to harmful substances.
- Hot Work Permit - heat or sparks are generated by work such as welding, burning, cutting, riveting, grinding, drilling, and where work involves the use of pneumatic hammers and chippers, non-explosion proof electrical equipment (lights, tools, and heaters), and internal combustion engines.
- Cold Work Permit - used in hazardous maintenance work that does not involve “hot work”. Cold work permits are issued when there is no reasonable source of ignition, and when all contact with harmful substances has been eliminated or appropriate precautions taken.

Some special permits can be used to cover specific hazards such as:

- extremely hazardous conditions
- radioactive materials
- PCBs and other dangerous chemicals
- excavations
- power supplies

EXAMPLE OF A SAFE WORK PERMIT CHECKLIST

A safe work permit is a written record that identifies

- The date, time of issue, and time of expiry of the permit
- The location of the work - it must be as specific as possible
- The department or company doing the work
- A description of the work to be done
- Any toxic, corrosive, flammable, or other dangerous materials in the immediate work area
- Whether the work area has been inspected and found free of the above materials
- The need for fire protection
- The need for isolation - electrical and mechanical hazards locked out and tagged, piping blanked off, tagged, disconnected, drained, or vented
- The need for ventilation - air, steam, inert gas purge
- The need for testing prior to or during the work for:
- harmful substances
- combustible gases
- oxygen deficiency
- other hazards e.g. radiation
- any specific health hazard - is SDS information required
- The need for specific personal protective equipment to protect the worker from the hazard
- The need for specific personal protective equipment to protect the worker from the hazard
- The need for emergency procedures and competent rescue personnel
- A special instructions and comments section — special procedures, special precautions
- A general instruction-to-receiver section
- The name and job title of the person who issued the permit and when
- The name and job title of the person who received the permit and when
- That the work has been completed and the permit signed by the person returning it
- The name of the person signing off the permit and whether or not the work has been completed.

1.0 ASBESTOS

1.1 PURPOSE

The purpose of this program is to ensure workers take appropriate safety precautions while working around asbestos. This program covers the dangers of asbestos, general guidelines and training requirements and to provide basic precautions and protection for workers to avoid exposure to asbestos containing material (ACM) or presumed asbestos containing material (PACM). The material in this document does not take precedence over applicable government legislation which all workers must follow.

1.2 SCOPE

This program applies to and is to be followed by all Control Tech affected workers and subcontractors. When work is performed on a site under the control of a prime contractor, the prime contractor program shall take precedence.

Control Tech operations where workers whose work activities may be in the vicinity of asbestos containing materials during their work activities. If workers working adjacent to Class I asbestos jobs are exposed to asbestos due to the inadequate containment of such jobs Control Tech shall either remove the workers from the area until the enclosure breach is repaired or perform an initial exposure assessment.

1.3 RESPONSIBILITIES

Managers

- Ensure the health and safety of all workers at the worksite
- Identify workplace hazards and assess the risks of injury associated with those hazards
- Conduct a risk assessment for asbestos exposure, develop an exposure control plan, write safe work procedures, and implement controls
- Conduct regular safety inspections to track exposure to hazards.
- Control the release of asbestos fibres to keep the concentration of fibres in the air as low as reasonably practicable
- Ensure that workers at the work site are protected from exposure to asbestos and other hazards;
- Develop work procedures to minimize exposure to asbestos
- Provide suitable personal protective equipment to workers
- Train workers in the hazards of asbestos
- Train workers in the employer's work procedures
- Ensure that asbestos exposed workers are provided with a health assessment

Supervisors

- Ensure exposure control plan is completed and followed
- Instruct workers in safe work procedures.
- Ensure that workers are familiar with and follow the exposure control plan.
- Train workers for all tasks assigned to them, and regularly check that they are doing their work safely.
- Ensure that only authorized, adequately trained workers operate tools and equipment or use hazardous materials.
- Ensure that workers follow safe work procedures for handling, storing, and maintaining equipment and materials.
- Enforce health and safety requirements.
- Ensure unsafe acts and conditions are corrected.
- Inspect the workplace regularly for hazard.

Workers

- All non-trained workers are required to discontinue work if there is an unresolved concern regarding exposure to asbestos.
- Only trained and certified workers will work in areas known to contain asbestos or has the potential to contain asbestos. These workers have the following responsibilities:
    - Know hazards associated with working with asbestos
    - Follow Control Tech's work procedures
    - Practice good personal hygiene
    - Wear the protective equipment required for the work and use the equipment properly
    - Participate in training programs provided by Control Tech.
    - Know and follow health and safety requirements that apply to the job.
    - Ask the supervisor for training to perform work tasks and use equipment safely.
    - Participate in all required health and safety education and training.
    - Work safely, and encourage co-workers to do the same.
    - Use all required PPE and clothing.
- Correct any unsafe conditions or immediately report them to a supervisor.
- Immediately report any injury to a first aid attendant or supervisor.
- Inform a supervisor of any physical or mental impairments that may affect work safety.
- Make suggestions to improve health and safety.
- Immediately report any suspected asbestos containing material to their supervisor

Prime contractors:

- Ensure the coordination of health and safety activities for employers, workers, and others at the workplace.
- Do everything that is reasonably practicable to establish and maintain a system or process that will ensure compliance with the relevant sections of the WCB & OHS legislation.
- Each employer at a multiple-employer workplace must give the prime contractor the name of the person Control Tech has designated to supervise his or her workers.

Consultants

- Should be occupational health and safety professionals with experience in the practice of occupational hygiene as it relates to asbestos management
- Should only provide advice and information based on their education, training, and experience
- Must follow accepted occupational hygiene practices, including those related to:
- Collection and identification of samples
- Reporting of sample results
- Performance of risk assessments
- Development of safe work procedures
- Implementation of exposure control methods
- Should provide documentation within a reasonable time frame and clearly explain any results, conclusions, or recommendations

Qualified Persons

Qualified person must have knowledge of the management and control of asbestos hazards through education and training, and have experience in the management and control of asbestos hazards. When asbestos-containing materials may be present, a qualified person should be an occupational health and safety professional with occupational hygiene experience related to asbestos.

These persons would include the following:

- Certified Industrial Hygienist (CIH), Registered Occupational Hygienist (ROH), or Registered Occupational Hygiene Technologist (ROHT) with education and experience specific to asbestos management and work procedures
- Certified Safety Professional (CSP), Canadian Registered Safety Professional (CRSP), or Professional Engineer with education and experience specific to asbestos management and work procedures
- An experienced asbestos abatement contractor with education and experience specific to asbestos management and work procedures
- An AHERA (U.S. Asbestos Hazard Emergency Response Act) Certified inspector (for asbestos building surveys only)

The following activities must be conducted by a qualified person:

- Preparation of asbestos inventories or surveys
- Risk assessments and work classifications (e.g., low, moderate, or high risk)
- Preparation of work procedures for the safe removal of asbestos waste
- Collection of samples of materials suspected of containing asbestos

In addition, only a qualified person should:

- Collect air samples to determine the concentration of asbestos fibres in the air
- Perform regular worksite inspections for high-risk work
- Perform post-abatement clearance inspections

1.4 DEFINITIONS

Asbestos - Asbestos is a group of naturally occurring minerals used in many products because it adds strength, heat resistance, and chemical resistance. Asbestos is a hazardous material. Asbestos can be defined as friable or non-friable.

- ***Friable Asbestos*** - the material can be crumbled with hand pressure and is therefore likely to emit fibres. The fibrous or fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable and they readily release airborne fibres if disturbed.
- ***Non-Friable Asbestos*** - generally does not emit airborne fibres unless subjected to sanding or sawing operations. Asbestos cement pipe or sheet can emit airborne fibres if the materials are cut, abraded or sawed, or if they are broken during demolition operations. Vinyl-asbestos floor tile or roofing felts are considered non-friable.

ACM - Asbestos Containing Materials

Asbestos inventory or survey - A written report that locates and describes, as far as reasonably practicable, the amount, condition, accessibility, and so on, of all asbestos-containing materials in a building or structure, or where renovations or demolition are planned. A survey conducted prior to renovations or demolition must be more detailed than an occupied building survey and include asbestos containing materials that are hidden or in inaccessible areas.

Asbestos management program - A program used to actively manage asbestos in our worksite. It includes inventory and identification of asbestos-containing materials, labelling systems, emergency response, a provision for reassessment, and worker education and training.

Containment -An isolation system designed to effectively contain asbestos fibres within a designated work area where asbestos-containing materials are handled, removed, encapsulated, or enclosed. Glove bags are a type of containment.

Encapsulation - A process in which a material containing asbestos is treated with a product that penetrates the material and prevents the fibres from being released.

Enclosure - A physical barrier that isolates asbestos-containing materials from adjacent occupied areas in a building, using means such as gypsum board, plywood, or metal sheeting to prevent the release of asbestos fibres into those areas.

Exposed Worker - is legally defined as a worker who may reasonably be expected to work in a restricted area at least 30 work days in a 12-month period.

HEPA Filter – a high-efficiency particulate air filter that is at least 99.97% efficient in collecting an aerosol particle 0.3 micrometre in size. Any HEPA filters used for asbestos applications must be at least 99.97% efficient.

High-risk work activity - a work activity that involves working with or in proximity to asbestos containing material if a high level of control is necessary to prevent worker exposure to airborne asbestos fibres.

Low-risk work activity - a work activity that involves working with or in proximity to asbestos containing material, if the material is not being:

- Cut, sanded, drilled, broken, ground down, or otherwise fragmented
- Disturbed in such a way that asbestos fibres may be released

Moderate-risk work activity - a work activity, other than a high-risk work activity, that involves working with or in proximity to asbestos-containing material that is being cut, sanded, drilled, broken, ground down or otherwise fragmented, or otherwise disturbed, where it is necessary to use personal protective equipment (PPE) or engineering controls to prevent worker exposure to airborne asbestos fibres.

Negative air unit - a cabinet, usually portable, that contains a fan and one or more HEPA filters. Negative air units are used to exhaust air from a containment area, reducing the risk of contaminated air escaping into the workplace through a leak in the containment. Negative air unit efficiency must be tested using a suitable indicator chemical, such as dioctyl phthalate (DOP) or polyalphaolefin (PAO) aerosols.

NIOSH 100 series filter - a high-efficiency particulate air (HEPA) filter used for respiratory protection. These HEPA filters, called “100” filters for short, are at least 99.97% efficient in collecting an aerosol particle 0.3 micrometre in size and carry an N, R, or P designation that specifies where and for how long the filter can be used.

FILTRE DESIGNATION	USED IN	TIME USE LIMITATIONS
N = No oil	Oil-free atmospheres only (atmospheres containing no oil mist	May be reused only after considering cleanliness, filter damage, and increase breathing resistance
R = Oil resistant	Oily atmospheres	A single shift only (or eight hours of continuous or intermittent use)
P = Oil proof	Oily atmospheres	Check the manufacturer’s specified time use limitations for each P-type filter

OEL — Occupational Exposure Limit

PFT — Pulmonary Function Test

Qualified Person - a person who has knowledge of the management and control of asbestos hazards through education and training, and has experience in the management and control of asbestos hazards.

Practicable - that which is reasonably capable of being done.

Respirator - A device worn to prevent the inhalation of hazardous airborne substances. There are two basic types of respirators: air purifying and air supplying. So-called “single-use” or “disposable” respirators are not acceptable for working with asbestos.

Restricted Area - an area of a work site where there is a reasonable chance that the airborne concentration of asbestos exceeds the OEL.

Risk assessment - comprehensive document, developed to select appropriate workplace controls that evaluates the probability and degree of possible illness, injury, or death in a hazardous situation.

Risk of exposure - likelihood of being exposed to airborne asbestos fibres when using or handling materials containing asbestos or being in proximity to such work.

1.5 RECORDS & RECORD RETENTION

Control Tech needs to keep records of the actions taken to prevent exposure to asbestos fibres. These recording requirements include:

- Must keep records of asbestos inventories, risk assessments, inspections, and air-monitoring results for at least 10 years
- Must keep records of corrective actions, NOPs (Notice of Project), and training and instruction of workers for at least 3 years
- Should keep asbestos survey results as long as asbestos remains in the building or structure.

1.6 TRAINING

Some provinces require specific training and steps to be taken before working with asbestos. Asbestos awareness training is provided for employees who work in areas with asbestos containing material (ACM) or presumed asbestos containing material (PACM).

Anyone working with asbestos must be educated and trained on:

- The hazards of asbestos exposure.
- How to identify asbestos-containing material.
- Personal hygiene and work practices, including the specific work procedures to be followed.
- The operation of the required engineering controls.
- The use, cleaning, maintenance and disposal of protective equipment and clothing.
- Disposal procedures for asbestos-contaminated materials.
- The purpose and significance of any required health monitoring.

The worker receives and keeps with them an original valid certificate of completion of an instructional course that is approved by the jurisdiction in which work is completed.

Subcontractors performing work shall comply with the requirements of this program and all applicable legislation requirements.

1.7 OCCUPATIONAL EXPOSURE LIMIT (OEL)

Alberta's OHS legislation sets out employer and worker responsibilities at the work site. The 8-hour Occupational Exposure Limit (OEL) for all forms of asbestos is 0.1 fibres per cubic centimetre (f/cc).

1.8 HEALTH HAZARDS OF ASBESTOS

Exposure to asbestos has been shown to cause respiratory diseases such as lung cancer, asbestosis, mesothelioma and various types of cancer of the stomach and colon.

Asbestos can affect the body if the fibres are inhaled. Once inhaled, the fibres settle in the airways and lung tissues. Prolonged exposure to asbestos fibers has been shown to cause asbestosis, mesotheliomas, and various other types of cancer.

Asbestosis is a lung disease caused by exposure to high concentrations of asbestos over a long period of time. It takes from 10 to 30 years after exposure begins for the disease to show up. The main effects are scarring of the lung tissues and shortness of breath. These effects develop slowly and can worsen as the disease progresses, even if exposure stops.

Workers who smoke and are exposed to asbestos have a much greater risk (70 times greater) of developing lung cancer than non-smokers who are exposed to the same concentrations of fibres.

Mesothelioma is a rare cancer of the chest cavity or abdominal cavity linings. Exposure to asbestos increases the risk of mesothelioma. This disease has no cure and is almost always fatal. The time period between exposure and the onset of disease can range from 15 to 55 years depending on the amount of exposure.

In most cases the fibres are released only if the asbestos containing materials (ACM) is disturbed. Intact and undisturbed asbestos materials do not pose a health risk. The mere presence of asbestos does not mean that the health of occupants is endangered.

When ACM is properly managed, release of fibres into the air is prevented or minimized, and the risk of asbestos related disease can be reduced to a negligible level. However, asbestos materials can become hazardous when they release fibres into the air due to damage, disturbance, or deterioration over time.

The most dangerous exposure to asbestos is from inhaling airborne fibres. The body's defenses can trap and expel many of the particles. However, as the level of asbestos fibres increase many fibres bypass these defenses and become embedded in the lungs.

The fibres are not broken down by the body and can remain in body tissue indefinitely.

1.9 POSSIBLE LOCATIONS OF ASBESTOS IN THE WORKPLACE

If you work maintaining or doing construction in buildings built before 1990, there are many products which may contain asbestos.

Has historically been used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials.

May also be present in pipe and boiler insulation materials, pipeline wrap, and in sprayed-on materials located on beams, in crawlspaces, and between walls.

People can be exposed to asbestos when renovation or demolition activities are occurring. Small asbestos fibres can be released into the air when:

- Disturbing or removing insulation including insulation around hot water pipes and tanks.
- Removing or disturbing roofing shingles and felt or siding.
- Sanding, breaking apart or scraping vinyl asbestos floor tiles.
- Breaking apart soundproofing ceiling tiles.
- Sanding or disturbing plaster, including acoustical plaster.
- Sawing, drilling or smoothing rough edges of materials.
- Sanding or scraping older surface treatments, such as roofing compounds (including tar paper), spackling, sealants, paint, putty, caulking or drywall.
- Replacing some car parts such as brakes or transmission clutches. Check with your parts supplier to find out if any replacement parts contain asbestos.

ASBESTOS MATERIALS IN COMMERCIAL AND RESIDENTIAL BUILDINGS	
EXTERIOR	**INTERIOR**
• Asbestos cement pipes (e.g., drain pipes) • Roof felting • Asphalt shingles	• Spray-applied insulation (acoustic and fireproofing)

• Soffit boards • Stucco and textured paints • Asbestos cement siding • Brick mortar • Window putty • Deck undersheathing • Asbestos cement shingles	• Vermiculite (blown-in) insulation (e.g., in attics and wall cavities) • Paper backing on fibreglass insulation
FLOORING	**HEATING (HVAC) AND DUCTING**
• Vinyl sheet flooring and mastic • Vinyl floor tile and mastic • Poured flooring/levelling compound • Asphalt flooring • Vinyl sheet flooring with asbestos backing	• Furnace duct tape • Furnace/boiler insulation • Pipe (mechanical) insulation • Hot water tank insulation • Mastic • Asbestos rope and gaskets • Asbestos cement board • Asbestos cardboard insulation
WALLS AND CEILINGS	**OTHER**
• Drywall mud • Plaster • Asbestos cement board • Textured coatings • Ceiling tiles	• Fireplace box and mantel • Artificial fireplace logs and ashes • Fire doors • Insulation on electrical wiring • Fire blankets • Chalkboards • Heat reflectors • Penetration fire stopping • Light fixture backing (pot lights)

1.10 ASBESTOS EXPOSURE CONTROL PROGRAM AND PROCEDURES

Asbestos fibres must be inhaled to cause disease. Asbestos-containing products in good condition and that are not disturbed are not a direct health hazard. These products become a potential health hazard when they are disturbed so fibres are released. Workers having the highest risk of asbestos exposure are those involved in asbestos abatement projects (removal, enclosure or encapsulation of asbestos-containing products), those doing maintenance on equipment or buildings that use asbestos-containing products, or those who may work in an area where asbestos is being disturbed by others.

Where asbestos-containing products must be disturbed, four principles should be followed in any work procedures:

1. isolate the work area
2. protect workers
3. minimize the release of asbestos fibres
4. ensure that the area is properly cleaned up after the work is completed

The control plan addresses:

1. Containment of asbestos operations.
2. Controlling of the release of asbestos fibres.
3. The engineering controls, work practices, hygiene practices, and facilities necessary to control the exposure of a worker to asbestos.
4. Providing workers with task-specific work instructions that address both the hazards and the necessary controls.

5. Providing, using and maintaining appropriate personal protective equipment and clothing.
6. The methods and procedures needed to monitor the concentration of airborne asbestos and the exposure of a worker.
7. The methods needed to decontaminate workers clothes, etc.
8. The removal and cleanup of asbestos waste and related material.

1.10.1 ASBESTOS RISK ASSESSMENT

When the presence of asbestos is confirmed through bulk sample analysis or material is assumed to contain asbestos (for example, asbestos furnace duct tape, asbestos cement transite board, or asbestos exterior shingles), a risk assessment must be conducted before demolition work begins, to determine the exposure risk of workers and other people. The risk assessment must be conducted by a qualified person and helps define the scope of work for the abatement of asbestos.

A worker exposed to asbestos must have a health assessment within 30 days of becoming an "exposed worker" as defined in Part 1 of the OHS Code. The initial assessment is called a baseline health assessment. This assessment permits the early detection of any changes from the baseline measurements.

The health assessment consists of exposure and health history information, a chest x-ray, a radiologist's report, a lung function test, and a copy of the physician's interpretation and explanation of the health assessment.

The chest x-ray consists of a single back to front (posterior-anterior) view of the chest. The x-ray needs to be interpreted by a radiologist and the resulting report must be sent to the physician.

The chest x-ray consists of a single back to front (posterior-anterior) view of the chest. The x-ray needs to be interpreted by a radiologist and the resulting report must be sent to the physician.

Control Tech must ensure that a qualified person collects representative samples of suspected asbestos-containing materials and prepares an inventory of all asbestos-containing materials at the worksite. This inventory must be kept at the worksite and must be kept current.

The asbestos inspection process is generally referred to as an asbestos survey, and the person conducting the inspection is often referred to as the surveyor. The asbestos survey includes a walk-through inspection, sample collection, sample analysis, and reporting and communicating the results. Surveyors must be familiar with proper walk-through and sample collection practices.

<u>Two types of asbestos surveys are required under the Regulation:</u>

5. The inventory is must be prepared for occupied buildings as part of an asbestos management program. Not all asbestos-containing materials may be identified in this survey, as some are hidden or would be damaged by sampling.
6. The pre-demolition or pre-renovation survey that must locate all asbestos materials in the building or structure before any work commences, including materials that are hidden or normally inaccessible.

<u>Asbestos surveyors must have the following documentation and programs in place:</u>

1. Asbestos exposure control plan
2. Respirator program
3. Bulk sample collection safe work procedure

They should also be able to provide proof of their training (such as an AHERA certificate), experience, evidence that their laboratory is qualified to analyze asbestos samples, and a survey report template.

1.10.2 RESTRICTED & DESIGNATED AREAS

Before working with asbestos-containing material (ACM), Control Tech site supervisor must restrict entry into the designated work area to authorized persons who are adequately protected against the level of risk within the designated work area.

Site supervisor must:

- Identify and mark the boundary of the designated work area by barricades, fences, or similar means.
- Ensure that the immediate work area is cleared of objects, materials and equipment other than what is needed to do the work.
- Ensure that windows, doorways and all other openings are adequately sealed or secured to prevent the release of asbestos fibre into other work areas.
- Post signs at the boundaries of the designated work area indicating asbestos work is in progress, the hazards, and the precautions required for entering the work area. These signs must be posted in a conspicuous location at the entrances to and on the periphery of each restricted area, as appropriate, and must remain posted until the area is no longer a restricted area.

1.10.3 GENERAL SAFETY PRECAUTIONS

- Employees must observe posted signs and/or labels identifying asbestos containing material (ACM) and/or presumed asbestos containing material (PACM).
- Workers should not eat, drink, chew or smoke within any work area containing asbestos.
- Drop sheets and barriers used in the work area should be wet-wiped or vacuumed with a HEPA-filtered vacuum.
- Drop cloths should not be re-used.
- Barriers and portable enclosures should not be reused unless they are rigid and can be thoroughly cleaned.
- Compressed air must not be used to clean up and remove dust from any surface.
- Clean the work area frequently and at regular intervals during the work and immediately on completion of the work.
- Dust and waste should be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a container. The container must be:
- Dust tight and suitable for the type of waste,
- Impervious to asbestos,
- Labelled as containing asbestos waste with a warning that the dust from the contents should not be inhaled,
- Cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before being removed from the work area
- Removed from the workplace frequently and at regular intervals.

Before leaving the work area, workers must decontaminate their protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing. If the protective clothing will not be reused, the clothing should be placed in a container as described above. Workers must wash their hands and face before leaving the work area. Control Tech must provide adequate wash facilities.

A double locker may be used to assist workers with cleaning up after working with asbestos, particularly after medium- to high-risk operations. A "double locker" requires two locker rooms with showers between. Using double locker rooms allows workers remove asbestos contaminated clothes in one locker room, then shower off asbestos contaminants, then use the second locker area to keep their street clothes. Double locker rooms are required in certain jurisdictions.

Controlling the spread of dust beyond the work area is critically important so that people outside of the work area are not exposed to asbestos fibres. The specific controls to achieve this vary from using polyethylene

sheeting barriers for low-risk operations, to setting up a separate ventilation system, maintained under a negative pressure for high-risk work areas.

1.10.4 CLEAN UP AND WASTE DISPOSAL

Before any work involving asbestos takes place, the employer must ensure that procedures for the safe removal of asbestos dust and debris from the work area are set out in writing by a qualified person.

Waste must be removed:

- While work is in progress, at intervals necessary to eliminate or minimize the risk of exposure
- At the end of each work shift
- At the completion of work involving asbestos

The following methods are most appropriate for the safe removal of asbestos dust and debris:

- Use a HEPA vacuum.
- Wipe surfaces with a damp cloth or sponge to remove residual amounts of asbestos dust and debris.
- Wet-sweep or wet-mop to remove larger amounts of asbestos dust and debris.
- Use a shovel or similar tool to place larger amounts of dampened asbestos debris into a sealed container or doubled 6 mil asbestos bags.

A combination of these methods might be required, depending on the nature of the work and the risk level. Every worker must be instructed and trained in these written procedures.

Ensure that asbestos is properly disposed of in accordance with the appropriate provincial and municipal environmental requirements.

Workers and other people must not be exposed to asbestos during the demolition of a building or structure. The asbestos removal practices and any containment procedures must minimize the release of airborne asbestos fibres and must comply with all applicable asbestos requirements in the legislation.

Containment ventilation equipment (negative air units) must be run 24 hours a day as long as the work is in progress. Ventilation equipment must not be removed from the decontamination containment until the work has been completed and an air clearance granted.

1.10.5 AIR SAMPLING

Third-party sampling for airborne asbestos fibres during an abatement project should be performed by a qualified person, on behalf of the building owner or the prime contractor. Air-monitoring technicians should be employees of an asbestos laboratory or an asbestos consulting agency. It is not an accepted industry practice for asbestos abatement contractors to perform their own asbestos air monitoring.

Background Monitoring - When there are concerns an area may be contaminated with airborne asbestos if, for example, suspect materials have been damaged or disturbed, Background Air Monitoring can assist with the risk assessment process. Background Monitoring would usually be conducted in conjunction with a visual inspection of the area.

Personal Monitoring - Personal Monitoring measures airborne fibre concentrations in the immediate vicinity of persons involved with asbestos works, or who risk disturbing materials. Air samples are taken from the breathing zone, and workers should be using suitable Personal and Respiratory Protective Equipment (PPE & RPE).

Control or Leak Monitoring - During asbestos works, Control Monitoring is undertaken to confirm control measures are working, detect leaks in an enclosure, and check filters on negative air pressure units are intact. Elevated fibre levels identified through Control Monitoring indicate that actions need to be taken.

Clearance Monitoring - After works with friable (higher risk) asbestos materials in the workplace Clearance Monitoring is required. Clearance Monitoring, in conjunction with a thorough visual inspection, provides evidence that an area is safe for reoccupation after disturbance or removal of ACMs.

1.10.6 HEALTH ASSESSMENT PARAMETERS FOR WORKERS EXPOSED TO ASBESTOS

WORKER EXPOSED TO ASBESTOS BELOW THE OEL	WORKER WITH CONFIRMED ASBESTOS EXPOSURE ABOVE THE OEL, BUT NOT MEETING THE "EXPOSED WORKER" DEFINITION	ASBESTOS EXPOSED WORKER ACCORDING TO THE LEGAL DEFINITION OF A "EXPOSED WORKER"
Consult family doctor (inform doctor of potential exposure)	Consult family doctor (inform doctor of potential exposure)	Health assessment performed as required by law
Chest x-ray and PFT not recommended unless advised by family doctor History of exposure should be recorded (see below)		
History should cover: • worker's name • employer's name • occupational exposure to asbestos, industrial dusts and carcinogens • any significant exposure to asbestos, dusts or carcinogens during recreational or hobby activities • any symptoms related to impaired respiratory function or that may be an indication of asbestosis or malignancy • any past or present medical diagnoses of respiratory disease • history of smoking • dates of chest ex-ray and PFT3		

1.10.7 MEDICAL SURVEILLANCE

Regular medical monitoring is required for workers exposed to asbestos. This monitoring includes:

- Medical examinations and clinical tests of a worker which may include a screening chest radiograph, a lung function test, occupational exposure history, and a health questionnaire.
- Personal records to show the exposure of a worker to asbestos at the workplace, including the time-weighted average exposure of the worker and of the concentrations of asbestos. The records should also indicate how the concentrations were determined.

The records of medical examinations and clinical tests should be maintained by the physician who has examined the worker or by the person under whose direction the examination and tests have been performed.

Worker Health Assessment

A worker exposed to asbestos must have a health assessment within 30 days of becoming an "exposed worker" as defined by the legislation. The initial assessment is called a baseline health assessment. This assessment permits the early detection of any changes from the baseline measurements. Subsequent tests are compared to the initial assessment.

The health assessment consists of exposure and health history information, a chest x-ray, a radiologist's report, a lung function test, and a copy of the physician's interpretation and explanation of the health

assessment. Table 1 summarizes the parameters considered in the health assessment for workers exposed to asbestos. The complexity of the health assessment depends on the severity of the exposure to asbestos fibres.

The chest x-ray consists of a single back to front (posterior-anterior) view of the chest. The x-ray needs to be interpreted by a radiologist and the resulting report must be sent to the physician. The chest x-ray consists of a single back to front (posterior-anterior) view of the chest. The x-ray needs to be interpreted by a radiologist and the resulting report must be sent to the physician. Digital imaging format of x-rays is being used by some radiologists. Digital imaging can be used to meet the requirements in the OHS Code, section 40(2), provided that the imaging facility is able to print to file when requested.

The lung (pulmonary) function test is done by a pulmonary function technician and involves measuring the volume capacity of the lungs and the rate of air flow out of the lungs.

1.10.8 RESPIRATORY PROTECTION AND PERSONAL PROTECTIVE EQUIPMENT

Workers must wear the appropriate personal protective equipment (PPE) clothing and respirator for the type of work that they are doing. If workers require any PPE, employers should establish a PPE program that covers the selection, use and care of respirators and other PPE.

Respirators must be provided for workers working with or near asbestos. The respiratory equipment must be appropriate for the type of operation and the concentration of airborne asbestos.

Respirators must be:

- Properly fitted to the worker.
- Used and maintained according to written procedures established by Control Tech and are consistent with the manufacturer's specifications.
- Cleaned, disinfected and inspected after use on a regular basis.
- Inspected and repaired before being used by a worker.
- Stored in a convenient, clean and sanitary location when not in use.

Protective clothing must be provided by Control Tech and should:

- Be made of a material that does not readily retain nor permit penetration of asbestos fibres.
- Cover the head and body fully, fitting snugly at the ankles, wrists and neck in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
- Include suitable footwear.
- Be repaired or replaced if torn.

1.10.9 CLASSES OF ASBESTOS AND RISK LEVEL

In some jurisdictions (Manitoba, Ontario and New Brunswick), working with asbestos is closely regulated. Typically, the laws break the type of asbestos work into 3 classes. An example of this breakdown is as shown below:

CLASSES OF ASBESTOS AND RISK LEVEL	
TYPE 1 (LOW RISK)	• Installing or removing ceiling tiles covering an area less than 7.5 square metres. • Installing or removing other non-friable asbestos containing materials (ACM), and the tiles/material are not being broken, cut, drilled, abraded, ground, sanded or vibrated (e.g., dust is not being generated). • Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM if the material is wetted to control the spread of dust or fibres, and the work is done only with non-powered hand-held tools. (e.g., dust is being generated, but easy to control).

	• Removing less than 1 m² of drywall in which joint-filling compounds contain asbestos.
TYPE 2 (MEDIUM RISK)	• Removing all or part of a false ceiling to get access to a work area, if ACM is likely to be lying on the surface of the false ceiling. • The removal or disturbance of less than or equal to 1 m² of friable ACM during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship. • Enclosing friable ACM. • Applying tape, sealant, etc. to pipe or boiler insulation that is ACM. • Installing or removing ceiling tiles that are ACM if the tiles cover an area of greater than or equal to 7.5 m² and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated. • Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM if the material is not wetted to control the spread of dust or fibres, and the work is done only with non-powered hand-held tools. • Removing greater than or equal to 1 m² of drywall in which the joint filling compound has ACM. • Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done with power tools attached to dust-collecting devices equipped with high efficiency particulate air (HEPA) filters. • Removing insulation that is ACM from a pipe, duct, etc. using a glove bag. • Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is ACM. • An operation that is not mentioned above but may expose a worker to asbestos, and is not classified as a Type 1 or Type 3 operation.
TYPE 3 (HIGH RISK)	• The removal or disturbance of greater than 1 m² of friable ACM during the repair, alteration, maintenance or demolition of all/ part of a building, aircraft, ship, vehicle, etc. • The spray application of a sealant to friable ACM. • Cleaning or removing air handling equipment, including rigid ducting (excluding filters), in a building that has sprayed fireproofing that is ACM. • Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are ACMs. • Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACM, if the work is done with power tools not attached to dust-collecting devices equipped with HEPA filters. • Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products.

1.10.10 BULK MATERIAL SAMPLE COLLECTION GUIDE

BULK MATERIAL SAMPLE COLLECTION GUIDE		
TYPE OF MATERIAL	**AREA OF MATERIAL**	**MINIMUM NUMBER OF SAMPLES TO BE COLLECTED**
Surfacing materials, including textured coatings, drywall mud, plasters, and stucco	Less than 90 m2 (approximately 1,000 ft2)	At least 3 samples of each type of surfacing material
	Between 90 and 450 m2 (approximately 5,000 ft2)	At least 5 samples of each type of surfacing material
	Greater than 450 m2	At least 7 samples of each type of surfacing material

BULK MATERIAL SAMPLE COLLECTION GUIDE		
TYPE OF MATERIAL	**AREA OF MATERIAL**	**MINIMUM NUMBER OF SAMPLES TO BE COLLECTED**
Sprayed insulation and blown-in insulation, including sprayed fireproofing and vermiculite insulation (including vermiculite insulation within concrete masonry units, or CMUs)	Less than 90 m2 (approximately 1,000 ft2)	At least 3 samples
	Between 90 and 450 m2 (approximately 5,000 ft2)	At least 5 samples
	Greater than 450 m2	At least 7 samples
Flooring, including vinyl sheet flooring (and backing) and floor tiles	Any size	At least 1 sample per flooring type in each room (and 1 from each layer of flooring)
Mechanical insulation, including duct taping, pipe insulation, elbows and boiler/tank insulation	Any size	At least 3 samples
Mastics and putties, including Duct mastic (around penetrations) and window putty	Any size	At least 3 samples
Roofing materials, including felting and shingles	Less than 90 m2 (approximately 1,000 ft2)	At least 1 sample (each layer of material must be sampled)
	Between 90 and 450 m2 (approximately 5,000 ft2)	At least 2 samples (each layer of material must be sampled)
	Greater than 450 m2	At least 3 samples (each layer of material must be sampled)
Asbestos cement (transite) board and pipe	Any size	At least 1 sample
Other materials	Any size	At least 1 sample per type of material

2.0 BEHAVIOR BASED SAFETY (BBS)

2.1 PURPOSE

The Control Tech Behavior Based Safety (BBS) program is a process used to encourage safety and reduce risk in the workplace. This program has been developed to provide guidelines on the observation process on how to carry out the BBS program.

2.2 SCOPE

This program applies to all staff. Formal job observations are performed for the company's employees. Employees may be asked to participate in customer BBS programs.

2.3 RESPONSIBILITIES

Manager

- Actively promote and participate in the behaviour safety process by supporting the goals and objectives of the Behavior Based Safety process.
- Ensure that all employees are aware of what is expected of them regarding the BBS process.
- Encourage employees to participate in observations so that incidents/injuries are reduced in the workplace.
- Provide necessary resources to keep process productive.
- Attend safety meetings and offer feedback on areas of improvement.

Supervisor

- Promote and participate in the Behavior Based Safety process by reviewing BBS Observation Forms and give feedback, complete corrective actions needed, etc.
- Never use data from the Behavior Based Safety process in a punitive manner.
- Assist in problem solving and completing corrective actions in a timely manner.
- Understand the behaviour safety process and the benefits of reducing at-risk behavior.

Safety Manager

- Support the goals and objectives of the Behavior Based Safety process.
- Encourage, promote, provide technical support and assist in acquiring the resources needed for the Behavior Based Safety process.
- Address the concerns and suggestions of field personnel.
- Collect all observation data cards.
- Enter data into BBS database.
- Ensure training of observers and observes in program requirements

Employees

- Participate in program when requested
- Ensure training has been completed

Each employee plays a specific role in the Behavioral Based Safety process. These roles include person being observed, observer, supervisor, manager and safety manager.

Person being observed

- Be willing to be observed.
- Be open and cooperative.
- Avoid being defensive.

- Participate in problem-solving meetings.
- Be familiar with the Behavior Based Safety process.

Observer

- Learn the Behavior Based Safety process and the benefits of reducing at-risk behavior.
- Promote the Behavior Based Safety process.
- Make observing proactive.
- Be open to coaching.
- Be courteous and helpful.
- Assist workers by offering suggestions to safely perform a task or help them with a task if necessary.
- Communicate with the workers being observed.
- Give constructive feedback after observations.
- Stress the safe behavior before the at-risk behavior.
- Offer and work towards solutions of problems found.
- Record a comment for every recorded “at-risk” to include what and why. Make quality observations, concentrating on quality comments.

2.4 TRAINING

Employees are provided training on how to conduct job observations. Employees are provided training on job observations. Training must include how to conduct an observation and how to provide effective feedback on observed behavior.

2.5 OVERVIEW

Formal job observations are performed for the company's employees. Job observations are used to identify unsafe behaviors. They provide direct, measurable information on employees' work practices. Job observations should never be used to discipline employees. They are intended to help employees identify the safest ways to perform their work.

Behaviors are the observable actions of people. They provide direct, measurable information on employees' work practices. Job observations should never be used to discipline employees. They are intended to help employees identify the safest ways to perform their work.

Increasing the number of safe behaviors being performed is essential for incident elimination. Behavior Based Safety is a process that, along with the other controls, can help reduce injuries among workers. Observations on the jobsite will include the following:

- People involved in completing the job
- Processes used to complete the work
- Environment work is being completed
- Equipment used

Behaviors expected of workers, supervisors and management should be identified. Behaviors expected of workers, supervisors and management should be identified. There can be a number of sources of possible required behaviors:

- Learning experience reports
- Incident investigations
- Individuals who actually perform the work
- First aid/ injury records and details (i.e. part of body injured, action causing injury), incident and inspection trends

Key concepts teach employees to recognize when they may be in a state that increases the chances of an incident occurring:

- Rushing
- Frustration
- Fatigue
- Complacency (which can cause or contribute to these critical errors)
- Eyes not on task
- Mind not on task
- Line of fire
- Loss of balance/traction/grip (which in turn increase the risk of injury.)

The observation process is designed to raise safety awareness and provide feedback to management in order for management to make appropriate changes in design, process or procedure in order to reduce at-risk behavior.

Feedback is provided to observed employees after an observation is complete. Upon completion of an observation, the observer is expected to have a discussion with the employee he/she observed. The observer shall review the results with the observed employee, reinforce safe behaviors observed, describe unsafe behaviors observed, obtain feedback from the employee on why the work was performed that way, and emphasize that the purpose of observations is help employees perform their jobs safely, not to punish or discipline.

The key to this process is raising awareness of behaviour through observation and feedback. The process has three key elements:

2.6 STEPS TO THE BEHAVIOR BASED SAFETY PROCESS

STEP 1 IDENTIFY THE BEHAVIORS CRITICAL TO OBTAINING REQUIRED SAFETY PERFORMANCE THROUGH

- Completing Job Safety Analysis of job
- Learning experience reports
- Incident investigations
- Individuals who actually perform the work
- First aid/ injury records and details (i.e part of body injured, action causing injury), incident and inspection trends

STEP 2 COMMUNICATE THE BEHAVIORS AND HOW THEY ARE PERFORMED CORRECTLY TO ALL EMPLOYEES

All workers need to know what the required behaviors are and most important, how the required behaviors are performed safely.

STEP 3 OBSERVE AND RECORD SAFE/UNSAFE BEHAVIORS

This step is performed by workers who have received the proper training in how to:

- Perform observations
- Interact with the workers observed to provide feedback/correction/coaching
- Go out into the workplace to observe the workers
- Individuals providing this training should have a good understanding of the behaviour model used and the BBS process.

Observations should be planned when possible. There are a variety of different factors to be considered when performing an observation. These include:

- Consider observing work where the higher risk hazards, or the experience of the workers may be a factor
- Avoid interfering with the work activities

- Do observations in two person teams
- Complete the observation report away from the work area
- Examine the work area for access/egress, housekeeping

When planning observations here are some of the worker groups that can be observed:

- New employees
- Younger employees
- People under pressure/stress (mind on task)
- New sub-contractors
- People rushing/running

Steps to perform a complete observation /interaction include:

7. Observe the workers for 30 - 60 seconds as you approach them, introduce yourself to the workers. When doing this the observer should not distract the workers at a critical moment (e.g. Cutting, lifting, using ladders etc.). Wait until the interruption can occur when there will be no risk posed to the workers
8. Explain what you are doing and that you will observe them for a bit longer
9. Observe them for some additional time
10. Stop workers and provide feedback to the employee being observed after an observation is complete. The observer shall review the results with the observed employee, reinforce safe behaviors observed, describe unsafe behaviors observed, obtain feedback from the employee on why the work was performed that way, and emphasize that the purpose of observations is help employees perform their jobs safely, not to punish or discipline.
11. Provide positive reinforcement for all those behaviours that were performed in a safe manner
12. When at risk behaviours are observed ask for feedback from the workers to help understand why the at risk behaviours are being performed, and provide coaching/ correction so that the required safe behaviour is obtained
13. Thank the workers for their assistance,
14. Encourage them to continue to work safely

NOTE: All observed behaviours that are immediately dangerous to life, health or the environment are stopped as soon as they are observed. The observer does not follow the observation steps. The first priority is to stop the dangerous behaviour.

STEP 4 SUMMARIZE AND ANALYZE OBSERVATION DATA

All job observations are documented. Job observations must be documented on an observation form or checklist. Observation results are analyzed to identify trends and increase safe behaviors. Observation data should be summarized into a format that will be simple to interpret and enable extraction of behaviour performance data. During the analysis it is important to review the observation data for quality and consistency. Some suggested summaries are:

- Overall % Acceptable for all behaviours
- % Acceptable for each separate behaviour
- Observation comments
- Trend Chart - Overall % acceptable for all behaviours plotted over time
- Trend chart - % acceptable for each behaviour plotted over time
- Observation and Intervention activity data - # observations performed for each behaviour
- Charts showing correlation between behaviours and incidents

STEP 5 CREATE AN ACTION PLAN TO ELIMINATE UNDESIRABLE BEHAVIORS

- Evaluate unsafe behavior from trend analysis and prioritize
- Develop action plan for unsafe behavior based on comments and feedback from data sheets

- Designate responsible parties and timeframes within the action plan
- Define who is responsible for action planning
- Ensure management support

In most cases each intervention will involve positive reinforcement/feedback and correction coaching.

STEP 6 COMMUNICATE OBSERVATION DATA AND ANALYSIS RESULTS TO ALL EMPLOYEES

Observation results are analyzed to identify trends and increase safe behaviours. The results of the observations, the summarized data, the data analysis and any changes to previous circumstances, consequences or conditions are communicated to the employees. It is essential that this communication happen to ensure that the workers are kept informed of the results of the observations and changes that may be happening.

STEP 7 PROVIDE RECOGNITION OR CELEBRATE WHEN SAFE BEHAVIOUR IMPROVEMENTS OCCUR.

Appropriate recognition of the workers or celebrations happen when the desired, or improvements in, behavior performance occurs.

STEP 8 CHANGE BEHAVIORS TO BE OBSERVED OR CHANGE ACTIVATORS OR CHANGE CONSEQUENCES AS APPROPRIATE

Once desired behaviour is accomplished in observed behaviour then the behaviour being observed changes to other behaviours that need attention.

To help with problem solving the following can be considered:

- Improvement opportunities can be identified through observation, intervention and root cause trends
- Positive intervention techniques present the best opportunity for improvement
- Use knowledge and experience of others to assist
- Management system failures can typically account for 85% of unacceptable behaviours

Improvement strategies can include:

- Consider impact on existing safety program
- Obtain necessary support and resources
- May require changes to behaviour based training
- Monitor implementation and evaluate impact on behaviours

STEP 9 ACTION PLAN FOLLOW UP

All action plans shall be arranged by a set time period. To ensure effectiveness of the BBS follow-up is necessary to ensure the closure of all actions listed. The follow-up process will include:

- Monthly frequency for review of action by the safety manager, senior management and employees.
- Assign accountability for closeout of action plans within Control Tech.
- Document archiving of action plans with completed action items.

STEP 10 COMMUNICATE ANY CHANGES TO WORKERS

If the changes are going to be made it is essential that all the work force know what they are so they can change their behaviours accordingly.

3.0 BENZENE AWARENESS

3.1 PURPOSE

The purpose of this program is to define work practices, administrative procedures and engineering controls to protect employees exposed to benzene concentrations above the action level. This plan shall be implemented and kept current by the Safety Manager as required to reflect the most recent exposure monitoring data. The material in this document does not take precedence over applicable government legislation which all employees must follow.

3.2 SCOPE

This program applies to all employees who may be exposed to benzene in the course of completing job duties. The written plan shall be made available to authorities, affected employees and designated employee representatives. Employees will be aware of provisions of site specific contingency/emergency plans by either Control Tech or of a facility owner. When work is performed on a site under the control of a prime contractor, the prime contractor program shall take precedence.

3.3 RESPONSIBILITIES

Company

- Control Tech shall establish regulated areas wherever airborne concentration of benzene exceeds or can reasonably be expected to exceed the PEL or STEL.
- Control Tech will control access to regulated areas and limit access to authorized personnel.
- Company will ensure that safety precautions such as prohibition of smoking in areas where benzene is used/stored shall be taken.
- Ensure signs are posted in all regulated areas when the potential exists for benzene vapors to be in excess of the PEL
- Control Tech shall establish and implement a written program to reduce employee exposure to or below the PEL primarily by means of engineering and work practice controls to ensure compliance with the benzene control program and federal and state requirements.
- Control Tech will be aware of an owner's contingency plan provisions and ensure all employees are informed where benzene is used in host facility and aware of additional plant safety rules.
- Ensure the benzene control program is written and implemented to comply with national or local regulatory levels.

Manager or Designee

- The Control Tech Safety Manager will develop and implement project/task specific benzene control procedures prior to the start of activities that may include exposure to benzene.
- Ensure personnel are aware of work that has the potential of exposure to benzene.
- Ensure individuals responsible for monitoring areas of exposure are properly trained.
- Ensure personnel receive documented medical surveillance exams.
- Ensure that emergency exams are performed if an overexposure or suspected overexposure occurs.

Supervisors

- Ensure employees have the appropriate personal protective equipment (PPE) and are properly trained in its use and care.
- Ensure employees comply with the benzene control program.

Safety Manager

- In coordination with the Manager, develop and implement project/task specific benzene control procedures prior to the start of activities that may include exposure to benzene.
- Coordinate monitoring activities, ensuring monitoring equipment is in proper working order and, as necessary, modifying the benzene control procedures to reflect exposure monitoring data.
- Maintain the benzene control program, notify management of any regulatory changes and ensure compliance with regulatory, client and corporate requirements.
- Coordinate training activities.
- Coordinate the medical surveillance program, including maintenance of medical records and administration of exams.
- Ensure fire extinguishers shall always be readily available where benzene is used/stored. Benzene liquid is highly flammable and vapors may form explosive mixtures in air. Fire extinguishers must be readily available in areas where benzene is used or stored.

Employees

- Comply with the benzene control program.
- Know where benzene is used at Control Tech or client facilities and follow any of additional plant safety rules required by the client.
- Comply with the medical surveillance program and attend examinations as required.
- Inspect and maintain respiratory protection equipment so it is in good working condition and notify the supervisor of any problems prior to starting work. DO NOT USE DEFECTIVE EQUIPMENT!
- Review safety data sheets or consult with the supervisor to identify any container with benzene containing material.
- DO NOT smoke in prohibited areas where benzene is present.
- Report exposures symptoms immediately.

3.4 DEFINITIONS

Action Level – means an airborne concentration of benzene of 0.5 ppm calculated as an 8-hour time-weighted average.

Benzene – a toxic, colorless liquid or gaseous material. Benzene has an aromatic odor, is not soluble in water and is flammable.

Employee exposure – exposure to airborne benzene that would occur if the employee were not using respiratory protective equipment.

Health Effects – Short-term overexposure may cause irritation of eyes, nose and skin; breathlessness, irritability, euphoria, headache, dizziness or nausea. Long term effects may result in blood disorders such as leukemia and anemia.

3.5 TRAINING

All employees who may be exposed to Benzene must be trained in the following:

- Dangers of Benzene
- Control measures and procedures for exposure & emergency response

3.6 RECORDKEEPING

- Medical surveillance records shall be maintained for 30 years after termination of employment
- Exposure monitoring records shall be maintained for 30 years after completion of the project

- Exposure and medical monitoring records shall be made available to affected employees or their representatives and to OHS upon request

3.7 WHMIS 2015 CLASSIFICATION

Flammable Health Hazard Irritant

3.8 POSSIBLE LOCATIONS WHERE EMPLOYEES MAY BE EXPOSED

Possible locations where employees may be exposed to benzene during their job functions may include, but are not limited to:

- petroleum refining sites
- tank gauging (tanks at producing, pipeline & refining operations)
- field maintenance operations

3.9 POTENTIAL HEALTH EFFECTS OF BENZENE

Main Routes of Exposure: Inhalation. Skin contact. Eye contact.

Inhalation: Can irritate the nose and throat. Can harm the nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness.

- Skin Contact: SKIN IRRITANT. Causes moderate to severe irritation. Symptoms include pain, redness, and swelling. Can be absorbed through the skin, but harmful effects are not expected. Any skin contact will also involve significant inhalation exposure.
- Eye Contact: EYE IRRITANT. Causes moderate to severe irritation. Symptoms include sore, red eyes, and tearing. The vapour also irritates the eyes.
- Ingestion: Harmful. Can cause effects as described for inhalation. Aspiration hazard. May be drawn into the lungs if swallowed or vomited, causing severe lung damage. Death can result.
- Effects of Long-Term (Chronic) Exposure: Can cause dry, red, cracked skin (dermatitis) following skin contact.

VERY TOXIC. Can harm the blood. Can cause a decrease in the number or size of red blood cells (anemia). Can cause a decrease in white blood cells and platelets, and harm the immune system. Blood tests may show abnormal results.

May harm the nervous system. Conclusions cannot be drawn from the limited studies available.

3.10 FIRST AID MEASURES

Inhalation: Take precautions to prevent a fire (e.g. remove sources of ignition). Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Move victim to fresh air. Call a Poison Centre or doctor if the victim feels unwell.

Skin Contact: Avoid direct contact. Wear chemical protective clothing if necessary. Quickly take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately flush with lukewarm,

gently flowing water for 15-20 minutes. If irritation or pain persists, see a doctor. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal.

Eye Contact: Avoid direct contact. Wear chemical protective gloves if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay flushing or attempt to remove the lens. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation or pain persists, see a doctor.

Ingestion: Have victim rinse mouth with water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Immediately call a Poison Centre or doctor.

First Aid Comments: If exposed or concerned, see a doctor for medical advice. All first aid procedures should be periodically reviewed by a doctor familiar with the chemical and its conditions of use in the workplace.

3.11 FIRE HAZARDS AND EXTINGUISHING MEDIA

Flammable Properties: FLAMMABLE LIQUID. Can ignite at room temperature. Releases vapour that can form explosive mixture with air. Can be ignited by static discharge.

Suitable Extinguishing Media: Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog. Foam manufacturers should be consulted for recommendations regarding types of foams and application rates.

Specific Hazards Arising from the Chemical: Liquid can float on water and may travel to distant locations and/or spread fire. Liquid can accumulate static charge by flow, splashing or agitation. Vapour may travel a considerable distance to a source of ignition and flash back to a leak or open container. Vapour may accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a toxicity hazard. Closed containers may rupture violently when heated releasing contents. In a fire, the following hazardous materials may be generated: very toxic carbon monoxide, carbon dioxide; toxic, flammable aldehydes; and other chemicals.

3.12 PROCEDURES

3.12.1 EXPOSURE LIMITS

The time-weighted average limit (TWA) for benzene is:

- 8-hour TWA 1 ppm
- 12-hour TWA 0.67 ppm

The short-term exposure limit (STEL) for benzene is 5 ppm.

3.12.2 CONTROL MEASURES, HANDLING AND STORAGE PRACTICES

- Signs and labels shall be posted at entrances of regulated areas when the potential exists for benzene vapors to be in excess of the PEL
- The benzene control program shall be updated by the Control Tech Safety Manager
- Project site specific contingency and emergency procedures shall be updated by the Safety Manager and made available to project staff prior to beginning work at the specific site.
- Control Tech shall establish regulated areas wherever airborne concentration of benzene exceeds or can reasonably be expected to exceed the PEL or STEL.
- Control Tech will control access to regulated areas and limit access to authorized personnel.
- Safety precautions such as prohibition of smoking in areas where benzene is used/stored shall be taken. Smoking is prohibited in areas where benzene is used or stored.

Engineering Controls:

Use stringent control measures such as process enclosure to prevent product release into the workplace. Use backup controls (e.g. double mechanical pump seals) to prevent the release of this material due to equipment failure. Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored.

Personal Protective Equipment (PPE) when working with benzene:

PPE will be selected on the basis of its ability to prevent absorption, inhalation and ingestion.

PPE will reflect the needs of the employee based on work conditions, amount and duration of exposure and other known environmental factors but shall contain as a minimum; boots, proper eye protection, gloves, sleeves, aprons and others as determined.

PPE shall be provided and worn when appropriate to prevent eye contact and limit dermal exposure to liquid benzene. PPE must meet regulatory requirements and provided at no cost to the employees.

Eye/Face Protection:

Wear chemical safety goggles and face shield when contact is possible.

Skin Protection:

Wear chemical protective clothing e.g. gloves, aprons, boots. Suitable materials include: polyvinyl alcohol, Viton®, Barrier® (PE/PA/PE), Silver Shield/4H® (PE/EVAL/PE), Tychem® BR/LV, Tychem® Responder, Tychem® TK.

Respiratory Protection:

Wear a NIOSH approved self-contained breathing apparatus (SCBA) or supplied air respirator.

Respiratory protection is required:

- During the time period necessary to implement engineering controls or work practices.
- When engineering and work practices are not feasible.
- In emergencies.

Approved respirators shall be selected according to airborne concentrations of benzene or condition of use.

- 0 to 0.67 ppm – no respirator required
- 0.67 to 6.7 ppm – half-mask respirator with OV cartridges
- 6.7 to 33 ppm – full-face respirator with OV cartridges

- Greater than 33 ppm – Due to the Control Tech policy of not permitting SCBA no employee shall enter a space containing more than 33 ppm.

Handling:

Post "No Smoking" signs. Prevent accidental contact with incompatible chemicals. Avoid generating vapours or mists. Keep containers tightly closed when not in use or empty.

Storage:

Store in an area that is cool, well-ventilated, out of direct sunlight and away from heat and ignition sources, separate from incompatible materials, an approved, fire-resistant area, clear of combustible and flammable materials (e.g. old rags, cardboard). Electrically bond and ground containers. Ground clips must contact bare metal. Avoid bulk storage indoors.

3.12.3 ACCIDENTAL RELEASE MEASURES

1. In event of a spill or leak, immediately put on escape-type respirator.
2. Eliminate heat and ignition sources such as sparks, open flames, hot surfaces and static discharge.
3. Evacuate the area immediately.
4. Keep unnecessary and unprotected personnel out of spill area.

Methods for Containment and Clean-up:

- Stop or reduce leak if safe to do so.

Small spills or leaks:

1. Contain and soak up spill with absorbent that does not react with spilled product.
2. Place used absorbent into suitable, covered, labelled containers for disposal.
3. Flush spill area.

Large spills or leaks:

- Contact emergency services and manufacturer/supplier for advice.
- Report spills to local health, safety and environmental authorities, as required.

3.12.4 EXPOSURE MONITORING

Exposure monitoring shall be performed for the 8-hour and 12-hour TWAs or for the 15 minute STEL exposure when:

- Regulated areas are established
- An emergency occurs that could require a regulated area
- A change in the production, process, control equipment, personnel or work practices may result in new or additional exposure to benzene
- Cleanup of a spill, leak repair, or rupture occurs
- If the monitoring required reveals employee exposure at or above the action level but at or below the TWA, Control Tech shall repeat the monitoring for each employee at least every year.
- If the initial monitoring reveals employee exposure to be below the action level Control Tech may discontinue the monitoring.
- If the monitoring reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level Control Tech may discontinue to monitor.
- Direct reading detection instruments will be used where benzene vapors may be present in work areas not previously monitored.
- Personal monitoring will be performed by use of vapor monitoring badges following manufacturer requirements.

3.12.5 MEDICAL SURVEILLANCE

- Baseline and annual medical exams shall be provided to employees that may work or are anticipated to participate in operations more than 10 times per year or may work in areas where benzene exposures may exceed the PEL over 30 days per year.
- Control Tech shall make available a medical surveillance program for employees who are or may be exposed to benzene at or above the action level 30 or more days per year; for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; for employees who have been exposed to more than 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by their current employer.
- Notification of monitoring results shall be provided to employees in writing within 15 working days of receipt of results.

4.0 CHEMICAL BIOLOGICAL HAZARDS AND HARMFUL SUBSTANCES

4.1 PURPOSE

This program sets forth a plan for the control of any biological or chemical substance used, produced, stored or disposed of at the workplace and is critical to the overall safety and health of employees in accordance with OHS Regulations to ensure workers not be exposed to a concentration of a harmful substance that exceeds its Occupational Exposure Limits. The material in this document does not take precedence over applicable government legislation which all employees must follow.

4.2 SCOPE

This program applies to all employees of Control Tech, temporary employees and any contractors working for Control Tech.

When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

Control Tech shall at a worksite, develop and implement work procedures that are as safe as is reasonably practicable for the handling, use, storage, production and disposal of chemical and biological substances.

4.3 RESPONSIBILITIES

Company

- Identify, assess and properly control chemical and biological hazards.
- Develop and maintain a list of all chemical and biological substances that are regularly handled, used, stored, produced or disposed of in the course of work processes and that may be hazardous to the health and safety of the workers at the worksite. All chemical and biological substances that are hazardous products must be identified on the list. This list must be readily available to the workers at the worksite.
- Maintain written procedures that are prepared and implemented to prevent exposure by any route that could cause an adverse health effect, and to address emergency and cleanup procedures in the event of a spill or release of the substance.
- Inform employees of the nature and degree of health effects of the chemical substances to which the employee is exposed by their work
- Ensure the exposure of employees to harmful chemical substances is as little as is reasonably practicable and for substances for where a threshold limit value is currently established by the ACGIH and that threshold value is not exceeded.
- Train employees with regards to required control measures to keep them safe at work and ensure that the supervisors and the employees are trained in and follow the established procedures for safely handling, using, storing and disposing of the substance, including emergency and spill cleanup procedures.
- Ensure that an emergency response plan is developed for tasks involving chemical and biological substances.
- Maintain a Safety Data Sheet (SDS) control system.
- Ensure SDS' are readily available for workers use as required.
- Update the safety data sheets as required.

Supervisors

- Identify all potential chemical and biological hazards and risks to employees in their work area.
- Develop and implement measures to reduce, eliminate or control the identified risks.

- Develop procedures to respond to an emergency.
- Train employees about these hazards and the control strategies.
- Include chemical and biological hazard identification and control strategies as part of the new employee orientation process.
- Ensure employee compliance with safe work procedures.
- Train employees in safe work procedures and inform them of chemical and biological hazards.
- Supervise employees to ensure employee compliance.

Employee

- Being aware of the potential hazards of the chemicals at their worksite.
- Taking appropriate measures to minimize chemical hazards, as applicable to their situation.
- Using engineering controls, standard operating procedures and personal protective equipment.
- Contacting their supervisor when they have questions or concerns regarding chemical hazards.

Joint Health Safety and Health Committee

- Assist Control Tech and their supervisors to identify, assess and control chemical and biological hazards.
- Monitor the effectiveness of the implemented controls.
- Ensure training programs regarding identified chemical and biological hazards are developed and implemented for employees.

4.4 EDUCATION AND TRAINING FOR WORKERS

Workers are provided training on the chemical and biological hazards they may be exposed to. Control Tech must ensure that a worker who may be exposed to a harmful substance at a work site

- is informed of the health hazards associated with exposure to that substance
- is informed of measurements made of airborne concentrations of harmful substances at the work site,
- is trained in procedures developed by Control Tech to minimize the worker's exposure to harmful substances
- is trained in proper use of any personal protective equipment required by regulations

Emergency procedures developed that require the involvement of the worker or are necessary to protect the health and safety of the worker.

Additional British Columbia Requirements**:**

If a worker is or may be exposed to a chemical or biological substance which could cause an adverse health effect, Control Tech must ensure that the identity of the substance, its possible effects on worker health and safety and any precautions required to protect the health and safety of the worker are clearly communicated to the worker. Control Tech must ensure that the supervisor and the worker are trained in and follow the measures for the safe handling, use, storage, and disposal of the chemical agent or biological agent.

4.5 ASSESSMENT FOR HARMFUL SUBSTANCES IN THE WORKPLACE

Potential exposure to harmful substances is assessed through air sampling or air monitoring to ensure exposure does not exceed occupational exposure limits.

Control Tech assesses all information that is practicably available to Control Tech respecting a chemical or biological substance present in the workplace to determine if the substance creates or may create a risk to the safety or health of a worker in the workplace.

- If a worker is or may be exposed to a hazardous substance, Control Tech must ensure that
- a walkthrough survey is conducted to assess the potential for overexposure taking into account all routes of exposure, including inhalation, ingestion, and skin contact.

- a reassessment is conducted when there is a change in work conditions which may increase the exposure, such as a change in production rate, process, or equipment.

If the walk through survey reveals that a worker may be at risk of overexposure to an airborne contaminant, Control Tech must ensure that air sampling is conducted to assess the potential for overexposure.

Each Control Tech worksite site specific safety plan shall list the potential health hazards associated with any exposure to any chemical or biological hazards applicable to the specific tasks being performed.

If a worker is or may be exposed to a chemical agent, or biological agent designated as a hazardous substance which could cause an adverse health effects, Control Tech must ensure that:

- the identity of the chemical or biological agent, its effects on worker health and safety and any precautions must be clearly indicated by labels and SDSs and clearly communicated to the worker
- written procedures must be prepared and implemented to eliminate or minimize a risk of exposure to a chemical or biological agent by any route that could cause an adverse health effect
- written emergency and cleanup procedures must be prepared and implemented in the event of a spill or release of a chemical agent or biological agent
- the supervisor and the worker are trained in the safe handling, use, storage and disposal of the chemical agent or biological agent, including emergency and spill cleanup procedures

4.6 PROCEDURE FOR IDENTIFYING AND CONTROLLING HARMFUL SUBSTANCES

- Define the types of hazards.
- Determine the degree of risk to employees.
- Determine appropriate control measures for each chemical and biological hazard.
- Develop written safe work practices that identify the hazard(s) and state the control measures required, including any written emergency procedures to be implemented in the event of an accumulation, spill or leak.
- Train employees to identify chemical and biological hazard(s) and proceed with tasks using safe work procedures.
- Ensure the identity of the substance, its possible effects on employee health and safety and any precautions required for the health and safety of the employee are clearly indicated by labels, SDSs, placards, signs, tags or other similar means.
- Ensure employee compliance.

4.6.1 TYPES OF HAZARDS

Hazard - any activity, situation or substance that can cause harm. Categorizing the hazard(s) helps to determine the type of control(s) that may be necessary to protect employees. Biological hazards and chemical hazards are two of the categories and examples are noted below.

Biological hazards - Caused by organisms such as viruses, bacteria, fungi, parasites, dusts, molds or other living organisms.

Chemical hazards - Caused by solids, liquids, vapours, gases, dust, fumes or mists, such as battery acids, solvents, etc.

4.7 IDENTIFICATION OF CHEMICAL AND BIOLOGICAL HAZARDS IN THE WORKPLACE

Control Tech must ensure that no worker is exposed to a concentration of a harmful substance that exceeds the Occupational Exposure Limits including the ceiling limit, short-term exposure limit, or 8-hour TWA limit prescribed by ACGIH. Control Tech must assess all information that is practicably available respecting a chemical or biological substance present in the workplace to determine if the substance creates or may create a risk to the safety or health of an employee in the workplace.

Supervisors and local safety staff are responsible for identifying potential chemical and biological hazards and risks to employees. Chemical and biological hazards may be identified through data gathered by any of the following processes:

- Workplace inspections
- Job safety analysis (JSA)
- Dangerous occurrences
- Workplace incident reports (types and causes)
- Incident investigations
- Concerns raised by employees
- Employees' Compensation Board (WCB) claims
- Joint Health Safety and Health Committee minutes
- New or modified jobs
- New or modified equipment or job procedures
- New scientific information regarding hazards or risks
- Legislation (WSH, Transportation of Dangerous Goods, WHMIS)
- Industry standards (infection control)
- Regulatory (codes of practice, ANSI, CSA, provincial, territorial and local)
- Supplier, client or manufacturer information.

4.7.1 DETERMINING THE DEGREE OF RISK TO THE EMPLOYEE

Hazards need to be assessed by the degree of risk or harm posed to employees. When determining the degree of risk to employees, consider not only the probability or likelihood of the hazard causing harm, but also the potential severity of the harm. Probability is the chance that a hazard will cause harm. Severity is the seriousness of the harm that could be suffered. Risk represents the odds that a hazard will cause harm.

Common questions to ask that will help with assessing the degree of risk include:

1. How likely is the hazard to cause harm?
2. Under what conditions is harm likely to occur?
3. How quickly could an unsafe condition arise?
4. What type of harm is involved?
5. How many employees could get hurt?
6. Is there a history or problems, incidents or dangerous occurrences resulting from this hazard?
7. What monitoring is required to evaluate the risk?

When looking for hazards for a specific task, ask questions such as:

1. Can any body part be exposed to the substance?
2. Do tools, equipment or processes present any problems?
3. Can the employee make harmful contact with any materials?
4. Is there a danger from falling/spilling objects?
5. Is lighting a problem?
6. Can weather conditions affect the chemical or biological substance?
7. Is contact possible with hot, toxic or caustic substances?
8. Are there fumes, dusts, mists or vapors in the air?
9. What are the task and job specific risks?

4.8 POTENTIAL HAZARDS ASSOCIATED WITH EXPOSURE

Each Control Tech worksite specific safety plan shall list the potential health hazards associated with any exposure to any chemical or biological hazards applicable to the specific tasks being performed. Listed below are some of the chemicals/substances employees may be exposed. The following is a list of potential exposure and is not all-inclusive of hazards that may be present varying by jobsite location and work activity.

- Asbestos
- Benzene
- Hydrogen Sulfide
- Oils & Greases
- Compressed Gases
- Fuels
- Acids & Caustics
- Blood borne Pathogens (result of injury)

These hazards may be encountered near or around the following locations/processes/equipment:

- Tanks
- Pits
- Piping
- Well Heads
- Storage & Containment Facilities

4.8.1 POTENTIAL HEALTH HAZARDS ASSOCIATED WITH EXPOSURE

Potential health hazards are listed on the SDSs for each.

Asbestos Specific

- Asbestosis: A chronic lung ailment caused by the buildup of scar tissue inside the lungs.
- Asbestosis can cause shortness of breath, permanent lung damage, and increases the risk of lung infections.
- Mesothelioma: Asbestos caused cancer of the chest cavity lining or abdominal cavity.
- Other cancers: Cancer of the lung, esophagus, stomach, colon, and pancreas.

Hydrogen Sulfide (H2S)

- H2S paralyzes the sense of smell. Do Not Rely On Smell To Detect H2S – Rely Strictly On Instruments Designed To Measure Concentrations Of H2S.
- Hydrogen sulfide is a very dangerous and deadly gas - it is colorless and heavier than air.
- Exposure to certain concentrations of H2S can cause serious injury or death.

Benzene

- Short-term exposure causes depression of the central nervous system (CNS), marked by drowsiness, dizziness, headache, nausea, loss of coordination, confusion and unconsciousness.
- Exposure to 50 to 150 ppm produces headache, and tiredness.
- Nose and throat irritation have also been reported following short-term exposure.

Bloodborne Pathogen Specific

- HIV infection
- Hepatitis B infection
- Hepatitis C infection

Multiples Substance Common Health Effects

- Burn
- Eye irritation
- Breathing difficulty
- Confusion
- Sleepiness
- Rapid pulse
- Loss of consciousness

- Anemia
- Damage to the nervous system
- Kidney Damage
- A rise in blood pressure
- Miscarriages and subtle abortions
- Disruption of nervous systems
- Brain damage
- Declined fertility of men through sperm damage
- Suppression of the immune system
- Death

4.9 DETERMINATION AND IMPLEMENTATION OF APPROPRIATE CONTROL MEASURE(S)

Control Tech is responsible for determining and implementing control measures in an attempt to reduce, eliminate or control the hazard(s). Controls may be implemented at the source of the hazard, along the path between the hazard and the employee, and/or at the employee level. Control Tech shall protect workers from exposure to a hazardous biological or chemical agent without requiring the workers to wear and use personal protective equipment.

Where engineering controls are not in existence or are not obtainable; are not reasonable or not practical to adopt, install, or provide because of the duration or frequency of the exposures or because of the nature of the process, operation or work; or are rendered ineffective because of a temporary breakdown of such controls; or are ineffective to prevent, control, or limit exposure because of an emergency, Control Tech shall provide, and workers shall wear and use, personal protective equipment appropriate in the circumstances to protect the workers from exposure to a hazardous biological or chemical agent.

Often, more than one control method needs to be implemented in order to protect the health and safety of employees. Strategies used to reduce, eliminate or control hazards may include any one of the following:

4.9.1 CONTROLS AT THE SOURCE

Engineering controls either reduce or remove the hazard at the source or isolate employees from the hazard.

- Eliminate the risk by getting rid of the hazardous substance.
- Substitute the hazard with a less hazardous process or material.
- Redesign the layout of the workplaces, workstations, work processes and jobs.
- Isolate, contain or enclose the hazard, often used for chemical or biological hazards.
- Automate dangerous work processes by using mechanical equipment.

4.9.2 CONTROLS ALONG THE PATH TO THE EMPLOYEE

- Relocate by moving the hazard a safe distance from the employee.
- Create barriers between employee and the hazard to block the hazard path. For example, use of screens, walls, aprons or other personal protective equipment.
- Absorb the hazard by using local exhaust ventilation to remove toxic gases (airborne hazards) at the source where they are produced.
- Dilute the hazard, such as hazardous gases, by mixing with clean outside air.

4.9.3 CONTROLS AT THE EMPLOYEE

Work practice controls alter the manner in which a hazardous task is performed, such as minimizing exposure, prohibiting smoking, inspecting equipment and eating in regulated areas.

- Administrative controls such as implementation of new policies, improved and standardized work procedures, job rotations, shift scheduling and good supervision.

- Housekeeping, maintenance and repair to ensure cleaning, waste disposal and spill cleanup at the workplace, as well routine preventive maintenance and repair of equipment.
- Hygiene practices that can reduce the spread of infections such as frequent hand washing, lockers for changing between work and street clothes and footwear, separate eating areas away from the hazardous work area, etc.
- Personal protective equipment (PPE) such as gloves, respirators, eye protection and face shields are to be used as controls when other controls are not feasible are reasonably practicable, or where additional protection is required.
- Emergency washing facilities are provided within a work area where a worker's eyes or skin may be exposed to harmful or corrosive materials or other materials which may burn or irritate.

Written Safe Work Practices

Once chemical and biological hazards have been identified and control measures have been selected to reduce, eliminate or control the hazard, the safest way to perform the task must be put in writing. Safe work practices outline the step-by-step method for performing a particular task, including any potential or existing hazards present and the control measures that must be taken to eliminate, reduce or manage the risk. Safe work practices should also outline any emergency procedures required in the event that control measures are sufficient to protect the employee from harm.

Decontamination and Emergency Baths, Showers, Eye Wash Equipment

Emergency washing equipment is readily available. If a worker is present at a work site where chemicals harmful to the eyes or skin are used, Control Tech must ensure that the worker has immediate access at the worksite to emergency baths, showers, eye wash equipment, or other equipment appropriate for the potential level of exposure

Eyewash stations shall be present in all work locations and maintained at lukewarm temperature.

Prohibited Activities

Employees shall not eat, drink or smoke tobacco in an area of a work site that is contaminated with a harmful substance.

Monitoring

Control Tech will monitor the use or presence of employees' exposure to any chemical or biological substance that may be hazardous or harmful to the health or safety of an employee. An example is a portable H2S meter.

4.9.4 STORAGE OF HARMFUL SUBSTANCES

The Control Tech must ensure that a harmful substance used or stored at a work site:

- It shall be clearly identified or the container clearly identified
- Be used and stored in such a way the use or storage is not a hazard to any person

All containers, used or handled at a workplace, which by reason of toxicity, flammability or reactivity create risk to the health or safety of employees shall be contained, so far as is reasonably practicable in a suitable container which is clearly labelled to identify the substance, the hazards associated with its use or handling, the workplace uses for which it is intended, and protective measures to be taken by employees before, during and after its use.

Control Tech will ensure that residue or waste from the substance or materials used for cleaning or wiping it is placed into suitably labelled containers for safe disposal.

Harmful substances are to be stored in a self-contained enclosure, room or building that is isolated from work-related areas and worksites and is adequately ventilated and protected from conditions, including

excessive temperature, shock or vibration that could reduce the stability or increase the potential hazard of the substance.

Specific Programs if Applicable

If any harmful substance is present as related to the following list ensure the specific programs are followed:

- Asbestos Exposure Control Program
- Benzene Awareness Program
- H2S Program
- Ionizing Radiation Program
- Lead Awareness Program
- Silica (Abrasive Blasting Program)

4.9.5 RESTRICTED AREAS

These are areas where there is a reasonable likelihood that airborne concentrations of asbestos, silica, coal dust or lead will exceed their OELs. Control Tech shall ensure that only authorized persons or by law to do so enters a restricted area. Signs shall clearly indicate that:

- Asbestos, silica, coal dust or lead are present
- Only authorized person may enter and,
- Eating, drinking and smoking are prohibited

Control Tech is responsible for laundering clothing used by employees in a restricted area that contains asbestos or lead. This includes towels that are used for employee decontamination.

During storage and transportation, all contaminated protective clothing must be in sealed containers that are clearly labelled to identify the contaminants.

Employees must be warned not to inhale the dust during handling.

4.9.6 CODES OF PRACTICE

- Employees trained in the safe handling practices of hazardous chemicals such as acids, caustics, and the like.
- Employees aware of the potential hazards involving various chemicals stored or used in the workplace--such as acids, bases, caustics, epoxies, and phenols.
- Employee exposure to chemicals is kept within acceptable levels.
- Eye wash fountains and safety showers provided in areas where corrosive chemicals are handled.
- All containers, such as vats and storage tanks labeled as to their contents--e.g. "CAUSTICS".
- All employees required to use personal protective clothing and equipment when handling chemicals (i.e. gloves, eye protection, and respirators).
- Flammable or toxic chemicals kept in closed containers when not in use.
- Chemical piping systems clearly marked as to their content.
- Where corrosive liquids are frequently handled in open containers or drawn from storage vessels or pipelines, adequate means is readily available for neutralizing or disposing of spills or overflows properly and safely.
- Standard operating procedures have been established and are they being followed when cleaning up chemical spills.
- Where needed for emergency use, respirators are stored in a convenient, clean and sanitary location.
- Respirators intended for emergency use adequate for the various uses for which they may be needed.
- Employees prohibited from eating in areas where hazardous chemicals are present.
- Is personal protective equipment provided, used and maintained whenever necessary.

- There are written standard operating procedures for the selection and use of respirators where needed.
- Respirator protection program requires employees to be instructed on the correct usage and limitations of the respirators.
- The respirators NIOSH approved for this particular application.
- They regularly inspected and cleaned sanitized and maintained.
- Hazardous substances are used in your processes require a medical or biological monitoring system in operation.
- Familiar with the Threshold Limit Values or Permissible Exposure Limits of airborne contaminants and physical agents used in your workplace.
- Control procedures have been instituted for hazardous materials, where appropriate, such as respirators, ventilation systems, handling practices, and the like.
- Whenever possible, hazardous substances are handled in properly designed and exhausted booths or similar locations.
- Use general dilution or local exhaust ventilation systems to control dusts, vapors, gases, fumes, smoke, solvents or mists which may be generated in your workplace.
- Ventilation equipment is provided for removal of contaminants from such operations as production grinding, buffing, spray painting, and/or vapor decreasing, and is it operating properly.
- If internal combustion engines are used, carbon monoxide is kept within acceptable levels.
- Vacuuming used, rather than blowing or sweeping dusts whenever possible for cleanup.
- Materials, which give off toxic asphyxiates, suffocating or anesthetic fumes, are stored in remote or isolated locations when not in use.

4.9.7 ENSURING EMPLOYEE COMPLIANCE

Supervisors are responsible to ensure that employees comply with safe work procedures. Procedures are written to provide information and guidance to anyone performing a hazardous task or work process. Employees must comply with safe work procedures by using equipment and/or tools provided in order to do the task safely. Non-compliance with safe work practices may result in disciplinary action of the employee. Working safely is a condition of employment.

4.10 PROCEDURES TO BE FOLLOWED IN THE EVENT OF AN UNCONTROLLED RELEASE OR SPILL

Where there is a possibility of an accumulation, spill, or leak of a chemical substance or biological substance that may be hazardous to the health or safety of a worker at a place of employment Control Tech shall develop written emergency procedures to be implemented in the event of an accumulation, spill, or leak. The procedures shall be site specific based on the type of substance, containment methods, emergency notification, proper PPE and proper clean up and disposal methods and all workers involved trained prior to responding to the event.

4.10.1 UNCONTROLLED RELEASE:

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
2. **Alarm Others**
   - Call for help (“Man down”), sound bell, horn, whistle or call by radio
3. **Assess Situation**
   - Do a head count
   - Consider other hazards

4. **Protect Yourself**
   - Put on breathing apparatus before attempting rescue
5. **Rescue Others**
   - Remove victim to a safe area
6. **Revive Victim**
   - Administer CPR if necessary
7. **Call for Medical Aid**
   - Arrange transport of victim to medical aid
   - Provide information to Emergency Medical Services (EMS)

Evaluating/Assessing the Hazard.

Be aware of the chemicals you are responsible for and check them regularly. If you notice a leak make a quick assessment of the dangers based on the

- Identify the Chemical
- Size of the spill
- Location of spill
- Weather conditions. (if outside)
- Check: SDS for instructions
- Protect yourself and others.

If you decide you can safely control the spill,

- The first action must be to prevent injury.
- Use appropriate personal protective equipment.
- Work from the upwind side.
- Remove or shut off sources of ignition.
- Do not walk in the fluid.

Reducing the Hazard.

- If it is safe to do so - Stop the leak. Clean up the spill; absorb it, evaporate it, dilute it, cover it.

Reporting the Incident.

- Most chemicals used by Control Tech require a spill more than 30 litres to be reportable as a Transportation of Dangerous Goods occurrence. In most cases a spill needs only to be reported to management. If a spill of flammable liquid is large enough to be dangerous or is in a bad location, the fire department should be called.

If the spill is going down a sewer or into a waterway

1. Block or revert the spill as best you can
2. Call the fire department should also be called.
3. Report all spills immediately to dispatcher.

If legislated reportable quantity of dangerous goods is spilled:

The person or driver in charge of the dangerous goods at the time of the occurrence must make an immediate report to the police, Control Tech, the owner or lessee of the vehicle, and the owner or consignor of the dangerous goods.

4.10.2 DISPOSAL OF SPILLED CONTAMINANTS AND DEBRIS

Dispose of spent or used absorbent materials, PPE (Personal Protective Equipment) and other hazardous wastes that was collected in specially identified containers plastic bags, steel or plastic drums. These must be disposed of in special waste receiving facilities with appropriate manifests.

In small and moderate spills Control Tech dispatch office will arrange for pickup & disposal of the reclaimed spilled waste containers in accordance with BC Environmental Management Act, the Hazardous Waste Regulation and the Contaminated Sites Regulation.

4.10.3 SITE RESTORATION/REMEDIATION

Once the release or spill is controlled and the area has been determined safe for entry, clean-up may then proceed. Always wear appropriate personal equipment before commencing.

For small to medium liquid spills use appropriate spill absorbent kits (oil or chemical type). The degree of contamination and site clean-up in small to moderate spills may have to be addressed with technical support from _____.

Restoration can include physical removal of contaminated surface materials, high-pressure washing, chemical cleaning, replacing of contaminated soil materials, restocking of lakes, and bioremediation. Only personnel who have the appropriate qualifications should be allowed to perform site evaluation and site restoration. _____ is Control Tech's 1st Call Emergency Response Company for large spills. They are qualified to clean up all types of product spills that may occur in Control Tech.

_____, in consultation with Control Tech and the government regulatory agency will take the required action to restore the affected environment to the pre-spill conditions.

4.10.4 POST-INCIDENT EVALUATION

The primary purpose of the post-incident evaluation is to identify from the spill response operation the weaknesses or strengths of the Contingency Plan and to make appropriate corrections to the plan. Other uses for post-incident evaluation may include accounting, legal, and public relations matters. Post-incident evaluations are completed on both training exercises and actual emergency incidents.

The post-incident evaluation includes the following:

- Suitability of the organization structure, equipment, communication system, etc.
- Adequacy of training, alarm systems, contingency plan manual, control centre, communication plans, security, spill containment and recovery procedures, monitoring, etc.
- Appropriateness of the spill response action plan, media communications plan, etc.

4.10.5 LEGISLATION:

Control Tech must ensure that a worker's exposure to any substance listed in Schedule 1, Table 2 of the Alberta OHS Code is kept as low as reasonably achievable. Control Tech must ensure that a worker's exposure to any substance does not exceed its occupational exposure limits listed in Schedule 1, Table 2. A worker may not be exposed to a substance listed in Schedule 1, Table 2 at a concentration exceeding its ceiling limit at any time.

5.0 CONFINED SPACES PROGRAM

5.1 PURPOSE

The purpose of this procedure is to provide guidelines to all employees in order to ensure their safety while working in or being involved in a confined space activity. The material in this document does not take precedence over applicable government legislation which all employees must follow.

5.2 SCOPE

Some clients have specific Confined and/or Permit Confined procedures or requirements for contractors working on their job site. Control Tech employees shall follow client requirements for Confined and/or Permit Confined procedures or requirements as long as they meet or exceed this Control Tech Confined Spaces Procedure.

5.3 RESPONSIBILITIES

Control Tech management or any other trained, designated confined space entry job crew supervisor is responsible for the overall implementation of this program or the requirements of any host-facility program, while working on contracted projects at host-facilities.

Program Administrator/Safety Director

- Identify and evaluate possible confined spaces and determination as to permit. or non-permit required confined spaces;
- Develop a CSE protocol for each confined space to be entered, or development of a statement indicating that permit required confined spaces will not be entered under any circumstance;
- Train personnel as entrants, attendants, or observers;
- Provide proper PPE and air monitoring equipment for confined space evaluation;
- Properly label confined spaces;
- Maintain records of confined spaces, entries, air monitoring, and ventilation.

Entry Supervisors

- Ensure that confined spaces are not entered without application and implementation of the CSE program.
- Be aware of the elements of the CSE program and applicability to spaces in the supervisor's area or purview;
- Determine if acceptable entry conditions are present at the confined space where entry is planned.
- Assign personnel as entrants, attendants, or observers;
- Terminate entry when required,
- Undergo training as an entrant, attendant, or observer.

Employees

- Must be aware of and practice the requirements of the confined space entry program.
- Follow identified procedures when entering into confined spaces or standing by as an authorized observer, entrant, or attendant;
- Use specified equipment and PPE.

5.4 TRAINING FOR WORKERS

Workers are provided confined space training.

A worker assigned duties related to confined space or restricted space entry is trained by a competent person in:

- Recognizing hazards associated with working in confined spaces or restricted spaces, and
- Performing the workers duties in a safe and health manner.

Competence in the following is represented in the workers responding to a confined space or restricted space emergency:

- first aid
- the use of appropriate emergency response equipment
- procedures appropriate to the confined space or restricted space

Training will be provided:

- Before any personnel is assigned any duties.
- Before any assigned duties are changed.
- Whenever there is a change in operations affecting the space
- Whenever personnel demonstrate deficiencies or deviations from the initial training provided.

Written certification must include personnel's name, trainer signature/initials, and dates of training will be provided upon completion of required levels of training as provided by outside contract training resources, or Control Tech management, and maintained in the Safety files. Certification will be made available to personnel and their authorized representative.

Training Supervisors

Control Tech must assign responsibility for supervision to a person who is adequately trained to supervise the job before any worker enters a confined space.

5.5 WRITTEN CONFINED SPACE PROGRAM

Before a worker is required or permitted to enter a confined space, Control Tech must prepare and implement a written confined space entry program which includes an assignment of responsibilities, a list of each confined space or group of similar spaces and a hazard assessment of those spaces.

The plan shall contain written safe work procedures for entry into and work in the confined space that address where applicable:

- Identification and entry permits;
- Lockout and isolation;
- Verification and testing;
- Cleaning, purging, venting or inerting;
- Ventilation;
- Standby persons;
- Rescue;
- Lifelines, harnesses and lifting equipment;
- Personal protective equipment and other precautions;
- Coordination of work activities;
- The duties of workers;
- Adequate means for entering and exiting; and
- Adequate procedures for working in the presence of explosive or flammable substances.

5.6 HAZARD ASSESSMENTS

A hazard assessment must be conducted for each confined space or each group of confined spaces which share similar characteristics and work activity or group of work activities which present similar hazards to be performed inside a confined space.

Before any worker enters a confined space Control Tech shall ensure that an adequate assessment of the hazards related to the confined space has been carried out. Control Tech shall appoint a competent person to prepare a report in writing to:

- Identify and assess the hazards the worker(s) are is likely to be exposed to while in the confined space or restricted space,
- Specify the type and frequency of inspections and tests necessary to determine the likelihood of worker exposure to any of the identified hazards,
- Perform inspections and tests specified,
- Specify the safety and personal protective equipment required to perform the work, and
- Identify the personal protective equipment and emergency equipment to be used by a worker who undertakes rescue operations in the event of an accident or other emergency.

The content of the hazard assessment must consider:

- Condition which may exist prior to entry due to the confined space's design, location or use or which may develop during work activity inside the space.
- Potential for oxygen enrichment and deficiency, flammable gas, vapour or mist, combustible dust, other hazardous atmospheres, harmful substances requiring lockout and isolation, engulfment, entrapment and other hazardous conditions.

Eliminating or Minimizing Hazards

Written procedures specifying the means to eliminate or minimize all hazards likely to prevail must be developed based on the hazard assessment. Specifics should include:

- Measures to take to reduce or control or eliminate the risks to safety or health associated with the confined space;
- Alternative means to perform the work in a confined space that will not require the worker to enter the confined space; and
- Alterations to the physical characteristics of the confined spaces that may be necessary to ensure safe entrance to and exit from all accessible parts of each confined space.

5.7 PRE-ENTRY PREPARATION

5.7.1 PRE-ENTRY ATMOSPHERIC TESTING

Pre-entry atmospheric tests must be made before entering a confined space and the atmosphere must be periodically tested while persons are within the confined space.

If the hazard assessment identifies a potential atmospheric hazard and a worker is required or authorized by Control Tech to enter the confined space, a competent worker performs a pre-entry atmospheric test of the confined space to:

- verify that the oxygen content is between 19.5 percent and 23.0 percent by volume

- identify the amount of toxic, flammable, or explosive substance that may be present

As often as necessary after the first time a worker enters the confined space, a competent worker:

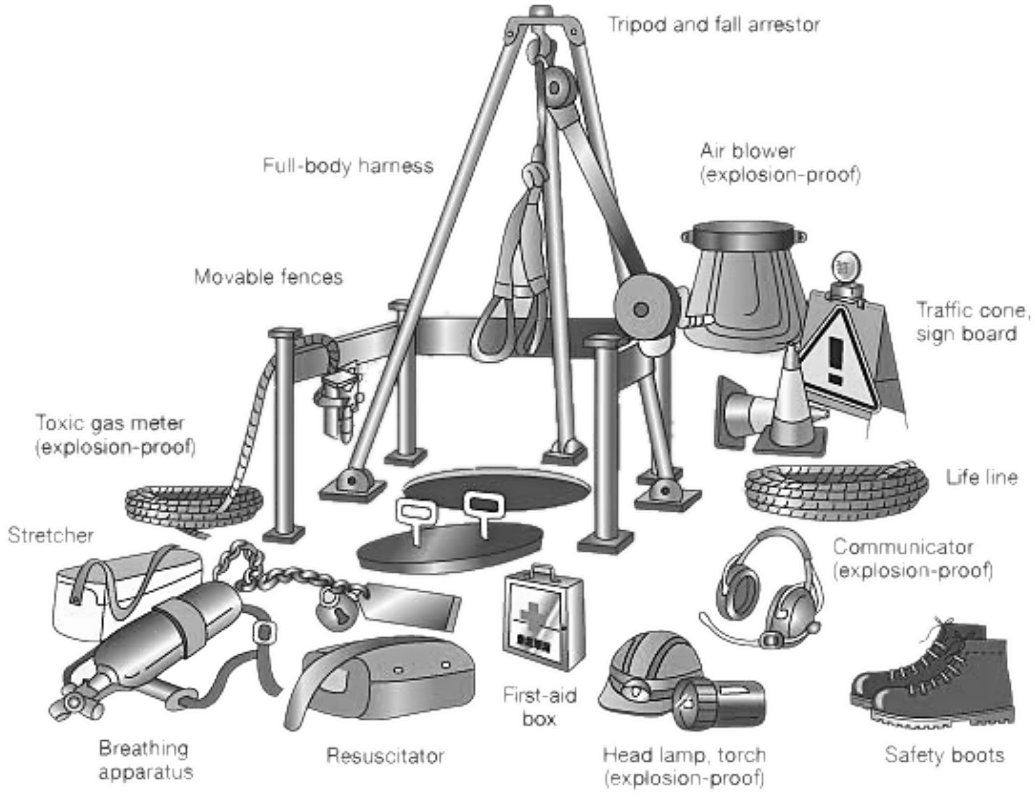
- performs atmospheric testing
- identifies and records any additional hazards

If there is a potential for the atmosphere to change unpredictably after a worker enters the confined space, the atmosphere is continuously monitored.

The pre-entry testing must be conducted as specified in the written work procedures and completed not more than 20 minutes before a worker enters a confined space. When all workers have vacated the confined space for more than 20 minutes pre-entry testing must be repeated.

When a worker occupies a confined space that has an atmosphere that may create a risk to the safety or health of a worker, Control Tech must ensure that the atmosphere is continuously monitored by a competent person.

Control Tech shall ensure that the results of every sample of a test are recorded. If the tests are performed using continuous monitoring Control Tech must ensure that test results are recorded at adequate intervals. The tests will be performed in a manner that does not endanger the health or safety of the person performing them.



5.7.2 WRITTEN ENTRY PERMITS

A confined space entry permit must be completed before entering a confined space. Before a worker enters a confined space, an entry permit is properly completed, signed by a competent person and a copy kept readily available.

Before a worker is required or permitted to enter a confined space, a competent person shall be appointed:

- to assess the hazards
- to test the atmosphere of the confined space where a hazardous atmosphere has been identified, for oxygen enrichment or deficiency, the presence of flammable or explosive substances, and the presence and hazardous concentration of airborne chemical substances
- Complete assessment including:
- work activities or processes will result in the release of toxic, flammable or explosive concentrations of any substances during the worker's occupation of the confined space
- measures have been taken to ensure that a worker will not drown or become entrapped in any liquid or free flowing solid present in the confined space
- the entry of any liquid, free-flowing solid or hazardous substance into the confined space in a quantity that could endanger the health or safety of the worker has been prevented
- all energy sources that present a hazard to a worker entering into, exiting from or occupying the confined space have been locked out, with the energy sources being put in a zero energy state
- any hazards from biological substances are present in the confined space
- the opening for entry into and exit from the confined space is sufficient to allow safe passage of a worker who is using personal protective equipment

Prepare a report in writing that sets out:

- the results of the assessment, tests and determinations
- recommended special precautions and procedures to reduce the risk to a worker that are to be followed by a worker entering into, exiting from or occupying the confined space
- recommended personal protective equipment to be used by a worker entering the confined space

Must establish an entry permit system for a confined space that:

- lists the name of each worker who enters the confined space and the reason for their entry
- gives the location of the confined space
- specifies the time during which an entry permit is valid
- takes into account the work being done in the confined space
- takes into account the code of practice requirements for entering, being in, and leaving a confined space

5.7.3 ALTERING AN ENTRY PERMIT

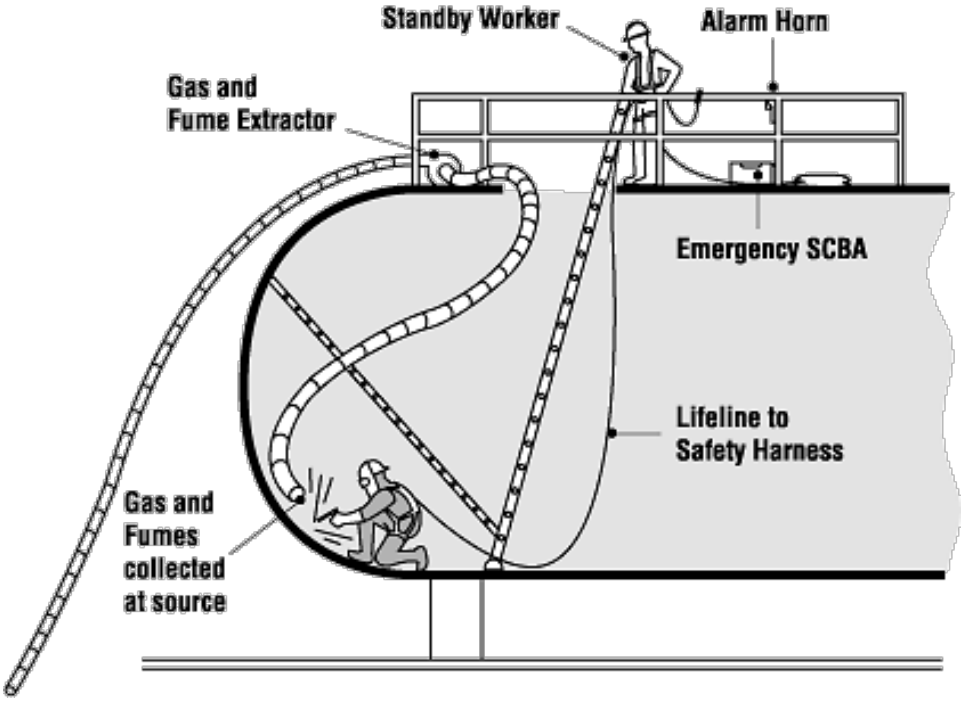
Once issued, the information on an entry permit may only be altered by the responsible supervisor who signed the permit to update it, the standby worker to update the list of workers inside the confined space or the tester to record test results.

5.8 ENTRY PROCEDURES

Workers will not be allowed to enter a permit confined space unless the following procedures are adhered to:

- The confined space must be properly tested for acceptable ranges of oxygen content, flammable atmosphere, and toxic concentrations present, using a calibrated, direct-reading, gas-monitoring instrument, operated by a trained supervisor. (There can be no longer than a 2hr time-gap between tests performed and any space entry.) Monitoring results will be reviewed with all entrants.
- The permit space shall be identified by appropriate signs, and the external area barricaded to ensure that no unauthorized persons, equipment, or vehicles present a danger to authorized entrants.
- Workers must not enter or remain in a confined space if more than 20% of the lower explosive limit (LEL) of an explosive substance is present in the atmosphere. If clean air cannot be assured in a confined space before worker entry, the concentrations of flammable gases and vapours are

maintained below 20% of the lower explosive limit and if flammable or explosive gases, vapours, or liquids are present all sources of ignition are eliminated or adequately controlled.



- A safe means of entry and exit shall be available to all workers required to work in a confined space and rescue personnel attending to the workers. Examples of methods to ensure safety include secured steps, temporary platforms and handrails may be suitable in certain circumstances, and ensuring the area is free and workers protected from traffic hazards in the vicinity of the confined space.
- No smoking or flammable, combustible materials are allowed within this barricaded area. A properly inspected, charged ABC dry chemical fire extinguisher is required to be outside the permit space, ready to use. No welding gas tanks are allowed inside the permit space, and all hoses, regulators, leads, electrode holders or other welding/cutting equipment will be inspected prior to entry into the permit space. Equipment found to be defective will not be allowed for use.
- For every confined space or restricted space entry there must be a designated competent worker who is in communication with a worker in the confined space or restricted space at all times. The designated worker must have a suitable system for summoning assistance.
- Communication methods will be by voice/visual contact, or 2-way radios that are required to be intrinsically-safe in design.
- Properly inspected, approved entry/exit means will be secured into position, following all established safe, ladder-use guidelines.
- Ventilation equipment will be activated and provide continuous forced air from clean air sources, so that proper air exchanges for the enclosed space is maintained at all times for permit space occupancy.
- Approved, properly-rated (12V, explosion-proof) light sources, or intrinsically-safe flashlights will be provided for safe illumination while working inside a permit space.
- Appropriately selected personal protective equipment will be donned prior to vessel entry, and worn at all times while inside the permit space. All PPE shall be inspected by a competent individual before use. Defective equipment shall not be used, but instead discarded, and replaced. (Examples are hard hats, splash/impact goggles, face-shields, safety glasses, respirators, protective clothing, steel-toed shoes, ear plugs, and gloves.)

- After the space has been tested and declared safe for entry, the entry permit shall be completed, conditions explained to all authorized personnel, signed by all authorized personnel, and posted at a conspicuous location on the vessel.
- The attendant shall be assigned to their appropriate duties; the entrants may then enter inside the confined space, and the entry supervisor accountable for maintaining safe operations.
- Permits will be cancelled upon completion of work, or for emergency evacuation due to dangers occurring inside or outside the space that could directly affect the life or health of an entrant.
- If an emergency occurs and evacuation of the space is required, the space will be re-evaluated to determine the cause, extent, and nature of the hazard encountered. The hazard will be eliminated before entry is again permitted, after inspection and testing is satisfactory.

5.8.1 ISOLATION OF THE SPACE

Hazardous substances and hazardous energy are isolated and locked out before a worker may enter a confined space. Workers within a confined space must be protected against the release of hazardous substances or energy that could harm them.

A worker does not enter a confined space unless adequate precautions are in place to protect a worker from drowning, engulfment, or entrapment. Any hazardous energy in a restricted space must be locked/ tagged out.

Before a worker enters a confined space, any material conveyance equipment that transports material to or from the space must be free of material if the material could present a hazard.

Before a worker enters a confined space where adjacent piping contains a harmful substance that is a liquid with sufficient volatility to produce a hazardous concentration of an air contaminant or a gas or vapour, the harmful substance in the adjacent piping must be controlled by either disconnecting the adjacent piping or isolating it using blanks or blinds.

Before a worker enters a confined space where adjacent piping contains a harmful substance that is neither a liquid with sufficient volatility to produce a hazardous concentration of an air contaminant nor a gas or vapour, the harmful substance in the adjacent piping must be controlled by either disconnecting the adjacent piping or isolating it using blanks or blinds or using a double block and bleed system.

Before a worker enters a confined space where adjacent piping contains a substance that is harmful only because of the temperature, pressure, or quantity of the substance, the harmful substance must be controlled:

- by either disconnecting the adjacent piping or isolating it using blanks or blinds or using a double block and bleed system,
- by isolating the adjacent piping in a manner that a professional engineer has certified will make the confined space safe for a worker to carry out the intended work, or
- if there is no head pressure in the adjacent piping, by de-energizing and locking out each pressure source for the adjacent piping and depressurizing the adjacent piping

5.8.2 UNAUTHORIZED ENTRY

If there is a possibility of unauthorized entry into a confined space, Control Tech shall ensure that each entrance to the confined space is adequately secured against unauthorized entry or has been provided with adequate barricades, adequate warning signs regarding unauthorized entry, or both.

For every confined space or restricted space entry, a competent worker is designated to be in communication with a worker in the confined space or restricted space. The designated worker must have a suitable system for summoning assistance

5.8.3 DUTIES OF AUTHORIZED ENTRANTS

Control Tech shall ensure that all authorized entrants:

- Know the hazards that may be faced during entry, including information on the mode, signs, or symptoms, and consequences of exposure.
- Properly use equipment as required. Ensure all equipment to be used has been inspected by a competent person prior to use.
- Communicate with the attendant as necessary to enable the attendant to monitor the entrant(s) status and to alert entrant(s) of the need to evacuate the space as required.

Authorized Entrants must alert the attendant when:

- They recognize any warning sign or symptoms of exposure to a dangerous situation or they detect a prohibited condition.

Authorized Entrants must exit from the permit space as quickly as possible when -

- An order to evacuate is given by the attendant or the entry supervisor
- They recognize any warning sign or symptom of exposure to a dangerous situation.
- They detect a prohibited condition.
- An evacuation alarm is activated.

5.8.4 DUTIES OF ENTRY SUPERVISORS

Control Tech shall assign responsibility for supervision to a person who is competent and adequately trained to supervise the job before any worker enters a confined space. The responsible supervisor must ensure that:

- pre-entry testing and inspection is conducted based on the written procedures,
- the precautions identified in the written procedures and the precautions required by Occupational Health and Safety (OHS) legislation or which are otherwise necessary for the health and safety of workers are followed, and
- only authorized workers enter a confined space

5.8.5 ATTENDANTS

An attendant shall be stationed outside a confined space while it is occupied by workers. Control Tech must designate a competent worker (attendant) to be in communication with a worker in a confined space or restricted space. The attendant must have a suitable system for summoning assistance.

If a worker enters a confined space which contains a low hazard atmosphere:

- another worker must be assigned as a standby person
- there must be a continuous means of summoning the standby person
- the standby person must check on the well-being of workers inside the space at least every 20 minutes
- the standby person must have a means to immediately summon rescue personnel

If a worker enters a confined space which contains a moderate hazard atmosphere:

- another worker or workers must be assigned as the standby person(s)
- a standby person must be stationed at or near the entrance to the space
- the standby person must visually observe or otherwise check the well-being of the worker(s) inside the space, as often as may be required by the nature of the work to be performed, but at least every 20 minutes
- there must be a continuous means of summoning the standby person from inside the space and
- the standby person must have a means to immediately summon rescue personnel

If a worker enters a confined space which contains a high hazard atmosphere, a risk of engulfment or entrapment or with any other recognized serious health or safety hazard:

- another worker or workers must be assigned as the standby person(s)
- the standby person(s) must be stationed at the entrance to the space and must continuously attend to the standby duties
- the standby person(s) must visually observe or otherwise continuously monitor the well-being of the worker(s) inside the space
- there must be a continuous means of summoning the standby person(s) from inside the space,
- the standby person(s) must be equipped and capable of immediately effecting rescue using lifting equipment if required or otherwise performing the duties of rescue persons and
- the standby person(s) must prevent the entanglement of lifelines and other equipment

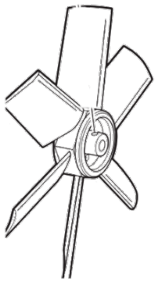
The attendant shall not enter the confined space at any time and shall, in accordance with the relevant plan monitor the safety of the worker inside, provide assistance to him or her and summon an adequate rescue response if required. Control Tech shall ensure that all attendants of workers in a hazardous confined space:

1. Know the hazards that may be faced during entry, including information on the mode, signs, symptoms, and consequences of the exposure.
2. Procedures will be developed for each confined space to properly protect personnel during entry. Barriers will be constructed as necessary to protect entrants from external hazards such as pedestrian, vehicle, or other external hazards. In addition, procedures must be developed for each confined space to verify that conditions in the permit space are acceptable for entry during its duration.
3. Attendants are aware of possible behaviour effects of hazard exposure in authorized entrants.
4. Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space.
5. Has been adequately trained in the rescue procedures. If an attendant is trained and equipped for rescue, they may attempt non-entry rescue provided that they have been relieved by a properly outfitted and trained attendant. Any unauthorized personnel will be prohibited from attempting any type of rescue.
6. Equipped with a suitable alarm to summon assistance and communicate with authorized entrants as necessary to monitor entrant status and alert entrants of the need to evacuate the space as required.
7. Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:
    - If they detect a prohibited condition
    - If Oxygen levels fall below 19.5% or rise above 23%
    - If rescue and emergency services are unavailable for any reason
    - If they detect the behavioural effects of hazard exposure in an authorized entrant
    - If they detect a situation outside the space that could endanger the authorized entrants
    - If they cannot, for any reason, effectively and safely perform all the duties required.
8. Summon rescue and other emergency services as soon as they determine that authorized entrants may need assistance to escape from permit space hazards. By whatever means are available (voice, radio, phone), the attendant shall notify their immediate supervisor, or host facility operator for emergencies.
9. Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
    - Warn the unauthorized persons that they must stay away from the permit space.
    - Advise the unauthorized persons that they must exit immediately if they have entered the permit space.
    - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
    - Perform non-entry rescue as specified by the Control Tech rescue procedure.

- Perform no duties that might interfere with their primary duty to monitor and protect the authorized entrants.

5.8.6 VENTILATION

Respiratory hazards are controlled using ventilation. Where ventilation is not practicable entrants must wear supplied air respiratory protective devices.



If atmospheric testing identifies that a hazardous atmosphere exists or is likely to exist in a confined space, Control Tech must ensure that the confined space is ventilated, purged, or both before a worker enters the confined space. If ventilating or purging a confined space is impractical or ineffective in eliminating a hazardous atmosphere, the employer must ensure that a worker who enters the confined space uses personal protective equipment appropriate for the conditions within the confined space.

If a confined space is known, or shown by pre-entry testing to contain other than clean breathable air, the hazard must be controlled by cleaning, purging or venting the space and the atmosphere must be retested before a worker enters the space. If clean breathable air cannot be assured in a confined space before worker entry Control Tech must ensure that all workers entering the space wear appropriate personal protective equipment including supplied air respirators when necessary.

When a worker occupies a confined space that has an atmosphere with an oxygen deficiency (oxygen content less than 19.5% by volume), or oxygen enrichment (oxygen content greater than 23% by volume), Control Tech must ensure that the space is continuously ventilated to maintain a safe atmosphere.

5.8.7 PPE

Workers who enter a confined space are provided proper PPE. Control Tech will ensure that each worker who enters a confined space is provided with adequate personal protective equipment, clothing and devices.

Control Tech shall ensure that a worker is provided with and required to use a respiratory protective device if the airborne concentration for any substance meets or exceeds the permissible contamination limit, oxygen deficiency or enrichment is detected or the airborne concentration of any other substance may be harmful to the worker.

5.9 CONFINED SPACE RESCUE PLAN

Rescue personnel and equipment are readily available to respond to a confined space emergency.

Personal protective equipment and emergency equipment must be available to workers undertaking rescue operations in a confined space to perform a timely rescue.

A worker must never enter or remain in a confined space unless an effective rescue can be carried out.

The emergency response plan must include the emergency procedures to be followed if there is an accident or other emergency, including procedures in place to evacuate the confined space immediately.

Control Tech must provide for the services of rescue persons when a worker enters a confined space. Control Tech must ensure that rescue personnel monitor any signalling system that will be used to summon the rescue persons in the event of an emergency whenever they have been informed by the responsible supervisor or the standby person that a confined space entry is in progress.

Rescue or evacuation from a confined space must be directed by a supervisor who is adequately trained in such procedures or a qualified rescue person.

Effective voice communication must be maintained at all times between workers engaged in the rescue or evacuation and the person directing the rescue.

A rescue worker must not enter a confined space unless there is at least one additional worker located outside to render assistance.

A self-contained breathing apparatus, or air supplied respirator with escape bottle, must be used during rescue operations in an unknown or IDLH atmosphere.

When entering a confined space which contains a high hazard atmosphere, a risk of entrapment or engulfment or with any other recognized serious health or safety hazard the worker must wear a harness of a type which will keep the worker in a position to permit rescue.

A lifeline must be attached to the harness and be tended at all times by a standby person stationed outside the entrance to the space.

The standby person must be equipped with suitable lifting equipment if necessary to permit rescue.

The emergency response plan shall include the emergency procedures to be followed if there is an accident or other emergency, including procedures in place to evacuate the confined space or restricted space immediately:

- If an evacuation should occur or when an alarm is activated,
- If the concentration of oxygen inside the space drops below 19.5% by volume or exceeds 23.0% by volume, or
- If there is a significant change in the amount of hazardous substances inside the space.

The respective host-facility in-house trained and supplied rescue team, or contracted outside rescue services will be notified to respond to the permit space to assist in retrieving an injured entrant. A documented, simulated rescue attempt will be performed by this crew as part of their established training regiment, and at least annually thereafter if confined spaces are still required to be entered.

5.10 RECORDS RETENTION

Permit records shall be kept for one year. A copy of the signed entry permit must be kept for at least one year.

Documents will be maintained in files at the local office by the supervisor, and at a minimum, reviewed annually to determine if any changes in the written program or procedures would be required if injuries, near-misses, personnel complaints, or entry problems occur.

6.0 CRANES, HOISTS, AND LIFT TRUCKS

6.1 PURPOSE

The purpose of this program is to outline the procedures for safe operations and the training requirements regarding for cranes, hoists and lifting devices. The material in this document does not take precedence over applicable government legislation which all employees must follow.

6.2 SCOPE

This program is applicable to all employees who operate overhead cranes, hoists, and rigging equipment in the scope of their job duties and assignments.

When work is performed on a site with more than 1 company present, the prime contractor program shall take precedence and shall be abided by. This document covers Control Tech employees and contractors on owned premises, or when a client's program doesn't exist or is less stringent.

6.3 RESPONSIBILITIES

Managers

- Control Tech shall ensure a copy of the manufacturer's operating manual for a hoist or crane is readily accessible to the operator and an operator of a hoist or crane is thoroughly trained in and implements the manufacturers recommended operating procedures.

Supervisors

- Verify the supporting structure is safe.
- Test the equipment after installation and prior to use.
- Establish and maintain a monthly and annual inspection program.
- Ensure that the designated operator is trained in the operation of that hoist, crane, or lifting device and ensure that no worker operates a hoist, crane or lifting device other than a designated operator.
- Establish a recordkeeping log for safety checks, maintenance, and repairs.
- Are responsible to see that all provisions of this program are followed and that rigging inspections are performed and the equipment is in safe operating condition.

Employees

- Lifting devices are only operated by competent workers.
- Personnel are responsible for visually checking the equipment they are using and reporting any observable wear, needed repairs or damage to their supervisor. They shall also report all equipment malfunctions immediately.
- Employees are responsible to follow the requirements of this program.

6.4 TRAINING

A lifting device must only be operated by a competent worker authorized by the employer to operate the equipment. A worker must not operate a lift truck unless the worker:

- is trained to safely operate the equipment
- has demonstrated competency in operating the equipment to a competent worker designated by Control Tech
- is familiar with the equipment's operating instructions
- is authorized by Control Tech to operate the equipment
- All Control Tech operators shall be trained in the safe work procedures in this program.

- Control Tech shall develop written procedures for safely erecting and dismantling a hoist or a crane and personnel provided documented training for those procedures.
- Operating controls shall be plainly marked to indicate the direction of travel.
- Control Tech shall ensure a copy of the manufacturers operating manual for a hoist or crane is readily accessible to the operator and an operator of a hoist or crane is thoroughly trained in and implements the manufacturers recommended operating procedures.

British Columbia Requirements:

A crane or hoist must only be operated by a qualified person who has been instructed to operate the equipment. A person must demonstrate competency, including familiarity with the operating instructions for the crane or hoist and the code of signals for hoisting operations authorized by the Board before operating the equipment. A person must not operate a lift truck unless the person has received adequate instruction in the safe use of the equipment, has demonstrated to a qualified supervisor or instructor competency in operating the equipment, and is familiar with the operating instructions for the equipment.

Any mobile crane, tower crane or boom truck must be operated only by a person with a valid operator's certificate issued by a person acceptable to local regulatory requirements, in accordance with any conditions stipulated on the certificate issued by a person acceptable to local regulatory requirements and in accordance with any conditions stipulated on the certificate.

6.5 PROCEDURES

6.5.1 LOAD CHART

Each hoist shall have a legible load chart showing the rated capacity in all permitted working positions and configurations of use, manufactures name, model, serial number and year of manufacture or shipment date permanently marked or noted clearly, permanently posted on the equipment, weatherproofed and conspicuous on the equipment and shall be kept legible at all times. The load chart will be issued to the equipment operator, who must have it available at all times when operating the equipment.

Safe working load must be clearly marked on a lifting device. Control Tech must ensure that a lifting device has a plate or weatherproof label permanently secured to it that legibly shows the manufacturer’s rated load capacity the manufacturer’s name, the model, serial number and year of manufacture or shipment date. If a lifting device is not commercially manufactured, an employer must ensure that it has a plate or weatherproof label permanently secured to it that legibly shows the rated load capacity according to the professional engineer’s certification.

If a lifting device is not commercially manufactured, an employer must ensure that it has a plate or weatherproof label permanently secured to it that legibly shows the rated load capacity according to the professional engineer’s certification.

British Columbia Requirements:

The rated capacity of a crane or hoist must be permanently indicated on the superstructure, hoist, and load block of the equipment. The rated capacity of a monorail crane must be permanently marked on the hoist and at intervals not exceeding 10 m (33 ft) on the monorail beam. If the rated capacity of a crane or hoist is affected by:

- the vertical or horizontal angle of a boom or jib
- the length of a boom or jib
- the position of a load supporting trolley, or
- the use or position of outriggers to increase the stability of the structure, a load chart must be permanently posted on the crane or hoist or must be issued to the crane or hoist operator who must keep it available at all times when operating the crane or hoist.

A load chart must indicate the rated capacity for the crane or hoist for the working positions and configurations in use and must be in a legible condition. Mobile equipment designed and used for lifting, hoisting, or similar operations must have a permanently affixed notation, legible and visible to the operator, stating the rated load of the equipment.

A load chart must be displayed in the operator's cab if the rated load varies with the reach of the equipment. If the equipment is modified, the employer must ensure that the rated load and load chart are changed as necessary to reflect the new load ratings.

6.5.2 PRIOR TO LIFTING

- All loads shall be hooked or slung under the direction of an experienced worker.
- Prior to operating any equipment the operator must be familiar with all recent entries in its log book.
- The operator must carry proof of training.
- Before the start of each shift or use an operator uses a crane or hoist, the operator must inspect the crane or hoist was inspected for that work shift, and the control and safety devices were tested for that work shift to detect any defect, malfunction or hazardous condition.
- A fire extinguisher having at least a 10 BC rating must be immediately available in the cab of each crane or other hoisting equipment.
- Operators of hoisting equipment shall disregard signals from anyone except designated signal persons but in an emergency other workers may give a stop signal.
- Where the design of a crane is such that the boom may fall over backward, positive boom stops shall be installed in accordance with the manufacturer's instructions.
- Control Tech shall develop adequate emergency rescue procedures and communicate these in writing to all workers involved with the hoisting operation.
- No worker shall ride or be permitted to ride on loads, hooks or similar equipment unless specifically authorized by his or her supervisor.

6.5.3 HANDLING THE LOAD

Size of Load

The rated capacity of a lifting device must not be exceeded. Control Tech shall ensure that a hoist, crane or lifting device is provided with a durable and clearly legible indication of the load rating that is readily accessible to the operator at the control station. Control Tech shall not require or permit the operator of a hoist, crane or lifting device to raise any load that is greater than the rated load determined by the manufacturer of the equipment or a professional engineer for the conditions in which the equipment is to be operated.

Attaching the Load

The load shall be attached to the hook by means of slings or other suitable and effective means which shall be properly rigged to ensure the safe handling of the load.

Chain and rope slings shall be free of kinks or twists before use.

Baskets, tubs, skips or similar containers used for hoisting bulk materials shall be loaded so as not to exceed their safe carrying capacity.

The hoist rope shall not be wrapped around the load.

The load shall not be moved without checking the balance and the brakes. Brakes are checked by raising the load a few inches and applying the brakes.

Load Lifting Manual

Safe lifting procedures can be found in the Lifting Handbook located in the operations office as designated for each work site by the Manager.

Safe Lifting

- A worker must not operate a lifting device if it may endanger other workers. If the operator of a lifting device has any doubts as to the safety of workers in the vicinity of the lift, the operator must not move any equipment or load until the operator is assured that the working conditions are safe. He or she shall report the circumstances to his or her supervisor who then shall be responsible for determining the action to be taken.
- Loads will be carried as close to the grade as possible and tag lines shall be rigged as necessary to control swinging of the load.
- Prior to moving a load ensure that the travel path of the load is free and clear of any undesirable obstructions.
- A suspended load shall not be left unattended by a worker.
- Ensure all workers which may be affected by the lift are aware of the hazards and are adequately protected.
- Loads shall not be passed over workers. Control Tech must ensure that work is arranged, if it is reasonably practicable, so that a load does not pass over workers. An operator of a lifting device must not pass the load on the device over workers unless no other practical alternative exists in the circumstances and the workers are effectively warned of the danger by an audible alarm or other effective means. The operator of a lifting device that is travelling with a load must ensure that the load is positioned as close to the ground or grade as possible.
- Workers shall not stand or pass under suspended loads. A worker must not stand or pass under a suspended load unless the worker has been effectively warned of the danger and the operator of the lifting device knows the worker is under the suspended load.
- Release the load only after the stability of the load has been verified and loads shall be safely landed and supported before unhooking.

If a hoist or crane is designed to be operated with outriggers or other stabilizing devices Control Tech shall ensure:

- The outriggers or other stabilizing devices are used in accordance with manufactures instructions.
- Are set on a solid footing or pad.
- Have their controls if any readily accessible to the operator and in a suitable position for safe operation.
- The area around the outriggers or other stabilizing devices is kept free of obstruction.
- There is a minimum clearance of 600 mm between any moving part of the crane and any obstacle near the base of the hoist or crane.
- Where there is a danger of a worker being trapped or crushed by any moving part of the crane when the crane swings, the area around the base of the crane is barricaded to restrict the entry of workers.

Use of Signal Person

A signal person must be utilized when the operator's view is obstructed. When the operator of a crane or hoist does not have a clear and unobstructed view of the boom, jib, load line, load hook and load throughout the whole range of the hoisting operation, the operator must act only on the directions of a qualified signaler who has a clear view of the things the operator cannot see.

The operator of the crane or hoist must stop the operation of the equipment on receiving a stop signal from any person. If a lift truck operator's view of the work area is obstructed, the operator must not move the lift truck until precautions have been taken to protect the operator and any other worker from injury, including:

- immediately before the movement, the inspection by the operator on foot of the area into which the lift truck will be moved
- direction by a signaler stationed in a safe position in continuous view of the operator and having an unobstructed view of the area into which the lift truck will move, or
- direction by a traffic control or warning system

6.5.4 REQUIREMENTS FOR RAISING AND LOWERING WORKERS WITH LIFTING DEVICES

If a crane or hoist will be used to raise or lower workers, Control Tech shall develop and implement work practices and procedures that will provide for:

- The safe raising and lowering of the workers.
- Training of the workers in the work practices and procedures.
- Ensure that the hoisting equipment and personnel lifting unit are inspected by a competent person before use and daily when in use.
- Ensure that the competent person records the details of the inspection in the log book.
- where the equipment is not designed for the specific purpose of hoisting personnel, the load applied to the crane, lift truck, or similar equipment is less than one half the maximum rated load;
- the platform has a sign indicating the load limits;
- where controls are provided at more than one location, each control station is provided with means whereby the operator can shut off power to the equipment, and interlocks have been provided so that only one station can be operative at any time; and
- except when the controls are operated from the platform, the controls are attended and operated by another worker

6.6 CRITICAL LIFTS

6.6.1 CRITICAL LIFT DESIGNATION

An appointed person shall classify each lift into one of the DOE categories (ordinary, critical, or pre-engineered production) prior to planning the lift.

A lift shall be designated critical if any of the following conditions are met:

1. The load item, if damaged or upset would result in a release into the environment of radioactive or hazardous material exceeding the established permissible environmental limits.
2. The load item is unique and, if damaged, would be irreplaceable or not repairable and is vital to a system, facility or project operation.
3. The cost to replace or repair the load item, or the delay in operations of having the load item damaged would have a negative impact on facility, organizational, or DOE budgets to the extent that it would affect program commitments.
4. A lift not meeting the above criteria shall also be designated critical if mishandling or dropping of the load would cause any of the above noted consequences to nearby installations or facilities.

Further site-specific criteria may be developed to supplement those cited above and may include loads which require exceptional care in handling because of size, weight, close-tolerance installation or high susceptibility to damage as well as lifts using multiple pieces of lifting equipment.

6.6.2 CRITICAL LIFT PROCEDURE

1. A critical lift plan must be developed and documented on the attached forms for any lifts where any of the following apply:
   - Load exceeds 75% of load chart.
   - Load endangers or is in close proximity to existing facilities (includes overhead power lines).
   - Two booms are required (side booms exempt).
   - Special rigging required.
   - Operator is not able to see the load.
   - Engineered lift (90% of load chart).
   - Side load exceeds 1•1.5%.

- At discretion of the client (with ample planning time).

2. For lifts as mentioned above, a planning team will be used to develop and document the procedure. As a minimum, the team should consist of:
   - Safety Designate
   - Supervisor
   - Crane Operator
   - Rigger
   - Owner Representative where applicable
   - Engineer (if engineered lift)
3. Lift planning team will determine and document the following:
   - Walk route and identify hazards
   - Plot plan (stamped by engineer for engineered lifts)
   - Maximum lifting radius
   - Crane lifting capacity at maximum lifting radius
   - Weight of load
   - Weight of rigging and hardware (include weight of jib)
   - Equipment certification and inspection
   - Capacity of rigging components
   - Lift lugs (engineered)
   - Matting ground condition requirements
   - Highest wind allowed for lift
   - Lowest temperature allowed for lift
   - Two-block consideration
   - Method of communication (operator/signal person)
   - Certified operator and qualified riggers
   - Elevation drawing showing clearances and facilities
   - Emergency response plan
4. Lift planning team will verify all rigging and equipment is in good operating condition.
5. Move into position and set up lift equipment
6. Attach rigging and hardware (include tag lines)
7. Perform test lift.
8. Verify all conditions for lift are still acceptable.
9. Complete lift, ensuring that tag line persons and signal person do not get underneath suspended load. Limit individuals in immediate work area to those directly involved in task.
10. Detach rigging and hardware.
11. Post-lift meeting of complete planning team to review and address and document any concerns which may have arisen.

Note: Refer to applicable provincial or territorial regulations or codes for clarification.

6.7 LOG BOOK PROCEDURE

A logbook must be maintained for each lifting device. Control Tech must set up a paper or electronic log book for each lifting device at each work site.

The log book will be readily available at all times to the operator and to another worker concerned with the maintenance and safe operation of the equipment. The operator shall be responsible for recording defects, operating difficulties, the need for maintenance and all maintenance and alteration work performed. If the operator requests they shall be given a copy of the log book.

The log book for the equipment at a project shall include the greater of the immediately preceding twelve months or the period the crane or similar hoisting device is on the project.

When not being operated the log book will be located in the operations office as designated for each work site by the Manager.

All log book entries shall, on a regular basis, be signed by the person who performs the inspection, maintenance or calibration and review.

The log book will include the following information:

- the date and time when any work was performed on the lifting device
- length of time in lifting service recorded as hours of service if the lifting device is equipped by the manufacturer with an hour meter, or if required by the manufacturer's specifications
- all defects or deficiencies and when they were detected
- inspections, including examinations, checks and tests, that are performed, including those specified in the manufacturer's specifications
- repairs or modifications performed
- a record of a certification
- any matter or incident that may affect the safe operation of the lifting device
- any other operational information specifically identified by the employer
- in the case of a tower crane, whether or not the weight testing device was lifted for that working day, before the work of lifting loads began

Control Tech must ensure that a record of lift truck inspections and maintenance is kept at the work site and readily available to a worker who operates the lift truck.

6.8 INSPECTIONS

Each lifting device must be inspected and maintained to ensure that every component is capable of carrying out its original design function with an adequate margin of safety and is maintained in good working order.

Lifting devices are inspected before use.

Control Tech shall ensure that a hoist, crane or lifting device is inspected by a competent person to determine whether the hoist, crane or lifting device is in safe working condition before the hoist, crane, or lifting device is used at the start of each work shift and at regular intervals as recommended by the manufacturer.

At the beginning of each shift, the competent operator shall visually inspect:

- Operating controls are marked to indicate the direction of travel
- The hoist for proper operation and structural elements
- The limit switches without a load on the hook
- The hook for deformation and cracks
- The cable and rigging equipment for excessive wear, broken wires, stretching, kinking, and twisting
- The load attachment chain for excessive wear, distorted or stretched links

At the beginning of each shift, the competent operator shall ensure the following components operate as they should:

- Limit switches
- Brakes
- Circuit breakers
- Other safety devices

Control Tech shall ensure that a mobile crane is subjected to a thorough inspection, including non-destructive testing, under the supervision of a professional engineer every two years or 1800 hours of operation, whichever comes first.

Control Tech shall ensure that a tower crane is subjected to a thorough inspection, including non-destructive testing, under the supervision of a professional engineer before erection at each site and at subsequent intervals of 2000 operating hours or one year, whichever occurs first.

New hoisting equipment, or hoisting equipment which has had modifications in the design or has undergone major repairs, shall be inspected and proof tested under the direction of a competent person before being placed in service. The competent person shall give a written warranty of the safe capacity of the equipment.

Any defects found during inspection or use of a crane or hoist must be recorded in the inspection and maintenance record system and be reported immediately to the supervisor, who must determine the course of action to be taken. If a defect affects the safe operation of the crane or hoist, the equipment must not be used until the defect has been remedied.

British Columbia Requirements:

Before an operator uses a crane or hoist, the operator must ensure that:

- the crane or hoist was inspected for that work shift, and
- the control and safety devices were tested for that work shift

The operator of a lift truck must inspect the equipment before the start of operation on the shift and thereafter as required to ensure the safe operating condition of the equipment.

Any repair or adjustment necessary for the safe operation of a lift truck must be made before the equipment is used.

6.8.1 NEW EQUIPMENT

Before being placed in service, new hoisting equipment, or hoisting equipment which has had modifications in the design or has undergone major repairs, shall be inspected and proof tested under the direction of a competent person who shall give the written warranty of the safe capacity of the equipment.

Daily

At the beginning of each shift, the competent operator shall visually inspect:

- The hoist for proper operation and structural elements.
- The limit switches without a load on the hook.
- The hook for deformation and cracks.
- The cable and rigging equipment for excessive wear, broken wires, stretching, kinking, and twisting.
- The load attachment chain for excessive wear, distorted or stretched links.

The following will be tested at the beginning of each shift by the competent operator:

- Limit switches
- Brakes
- Circuit breakers
- Other safety devices

Any defects found during inspection or use of a crane or hoist must be recorded in the inspection and maintenance record system and be reported immediately to the supervisor, who must determine the course of action to be taken. If a defect affects the safe operation of the crane or hoist, the equipment must not be used until the defect has been remedied.

Monthly

An inspection and written, signed report must be made by a designated individual at each facility, appointed by the manager, of all components used on or associated with the hoist. Components checked must include:

- Hoist or load attachment

- Chains and their end connections
- Wire rope slings
- Hooks and hook latches
- Motors and brakes
- Push buttons and other electrical equipment
- Hardware, sleeves, bolts, rivets, pins, and drums

Any defects must be corrected before the hoist is used. The report must be dated and signed by the person performing the inspection.

Yearly

Once each year a more detailed inspection must be made of all hoisting equipment at each facility. After completing the annual inspection, a report must be completed and signed by the person performing the inspection and the report will be returned promptly to the Safety Manager.

A mobile crane or boom truck must be inspected at least once every 12 months in accordance with good engineering practice, to ensure it meets the crane or boom truck manufacturer's specifications, the requirements of the applicable design or safety standard, and local regulatory requirements.

A mobile crane or boom truck must not be used after an inspection unless a professional engineer certifies it is safe for use on the basis of that inspection.

Also See Rigging

7.0 DEMOLITION

7.1 PURPOSE

The purpose of this program is to protect employees who may encounter demolition or blasting and explosive operations and the accompanying hazards while performing work. The material in this document does not take precedence over applicable government legislation which all employees must follow.

7.2 SCOPE

This procedure applies to Control Tech operations where employees may be exposed to demolition or blasting and explosive work during the course of their routine work.

This program is to ensure essential information regarding the hazards of demolition work and blasting / explosive work is communicated to our staff and controls the demolition or blasting and explosive contractor utilize to minimize any potential exposure. When work is performed on a non-owned or operated site, the operator's or their demolition or blasting and explosive services contractor's program shall be followed.

7.3 GENERAL

Before a demolition begins Control Tech shall ensure that all chemical or biological substances that may be hazardous to workers during demolition are removed from the structure or the part of the structure that is being demolished, and all glass is removed from the structure or the part of the structure that is being demolished and all gas, electrical, telecommunications, sewer and water services connected to the structure or the part of the structure that is being demolished are disconnected. Where power is required for illumination or other purposes, Control Tech shall provide a suitably located temporary power service.

7.4 DEMOLITION

Barricading and Signage

If falling material could endanger workers the danger area must be barricaded or effectively guarded to prevent entry by workers, and conspicuous warning signs must be displayed on all sides and approaches, or adequate protective canopies must be installed over the danger area, or adequate catch platforms or nets must be provided to stop materials from falling into areas accessible to workers.

Hazardous Materials

Before work begins on the demolition or salvage of machinery, equipment, buildings or structures Control Tech shall confirm there was an inspection of the site to identify any asbestos, lead, or other heavy metal or toxic, flammable or explosive materials that may be handled, disturbed or removed, have the inspection results available at the worksite, including any drawings, plans or specifications, as appropriate, to show the locations of any hazardous substances, ensure that any hazardous materials found are safely contained or removed, and if hazardous materials are discovered during demolition work that were not identified in the inspection, ensure that all work ceases until such materials are contained or removed.

Qualifications

In a demolition Control Tech shall appoint a competent supervisor to be in charge of the demolition at all times that the work is in progress.

7.4.1 DEMOLITION STEPS

Hazard Assessment and Removal of Harmful Substances

For all demolition projects, a written hazard assessment is required prior to work beginning. All chemical and biological substances that could pose a hazard to workers during demolition be removed from the structure (or part of the structure being demolished) prior to demolition.

- Insulation (fiberglass, asbestos, refractory ceramic fibre)
- Building materials containing asbestos
- Lead paint
- Mercury (fluorescent lights, switches, gauges)
- Polychlorinated biphenyls (liquid cooled electrical equipment, fluorescent light ballasts, paints, electrical insulating materials)
- Paints and solvents
- Oils and lubricants
- Fuels (gasoline, diesel)
- **B**atteries
- Process chemicals
- Glues
- Air conditioning system or cooling system chemicals (freon, halon, other chlorofluorocarbons)
- Compressed gases
- Welding rods and solder
- Mould
- Bacteria (medical waste, human or animal waste)
- Animal or human waste (sewage contamination, manure, bird droppings, rodent droppings)

Control Tech shall ensure that:

- A competent person develops a demolition procedure for the use of explosives.
- Appropriate method for disposing of the demolition waste is determined prior to job starting and according to environmental legislation.
- All electric, gas, water, steam, sewer and other service lines are disconnected before demolition begins (shut off, capped) by appropriate service provider (electrical company, gas company, etc.)
- Dust from the demolition is controlled to the extent that is reasonably practicable;
- Materials and debris are not allowed to accumulate in any area to the extent that the materials and debris cause overloading of a structure that could result in the collapse of all or part of the structure;
- Any opening or hole in a floor, roof or other surface on which workers are required or permitted to walk or stand is guarded or covered;
- A free-standing scaffold is used in the demolition of a building shaft from the inside;
- Steel structures are dismantled column length by column length and tier by tier from the top downward
- No wall or other part of the structure being demolished is left in an unstable condition or in danger of accidental collapse except during the actual demolition of that wall or part of the structure.
- A material chute steeper than 45° from the horizontal is constructed to enclose the material placed in the chute.
- Where a material chute presents a danger to workers, Control Tech shall ensure that a guardrail is installed around the top of the chute to prevent workers from falling into the chute.

Structural Members and Cranes

Control Tech shall ensure that structural members that are being removed are not under any stress other than the member's own weight and are secured or supported to prevent any unexpected movement.

Where a structural member is being hoisted by a crane or other similar lifting device from a structure being demolished or from the demolition rubble, Control Tech shall ensure that the hoisting line is in a vertical position and is over the centre of gravity of the load in a manner that will reduce the danger to workers from a swinging or uncontrolled load.

Stabilizing

Where the demolition of a structure may affect the stability of an adjoining structure, Control Tech shall ensure that the demolition is carried out in accordance with procedures certified in writing by a professional engineer to safeguard the stability of the adjoining structure and a copy of the procedures is kept at the worksite during demolition.

Housekeeping

Material and debris must not be allowed to accumulate on floors or on the ground outside the building or structure if workers will be endangered.

Clearances

In a demolition Control Tech shall ensure that all workers or equipment are located clear of any falling material and where a worker is or may be present in a building during its demolition shall ensure that the demolition is performed floor by floor from the top downward.

Powered Mobile Equipment

Before powered mobile equipment is placed on a floor, roof or other surface on which workers are required or permitted to walk or stand for the purpose of demolishing a structure, Control Tech shall ensure that the floor, roof or other surface is capable of supporting the load that may be placed on the floor, roof or other surface. Where powered mobile equipment is used for the purpose of demolishing a structure, Control Tech shall ensure that safe work procedures are developed and implemented.

7.5 EXPLOSIVES AND BLASTING

Qualifications

Where a structure is to be demolished by explosives, Control Tech shall ensure that the worker who undertakes the blasting activity has the training, competence and knowledge required to perform the work safely.

Dangerous Incident Reports Involving Explosives

If a blasting accident occurs which causes personal injury, or if there is any other dangerous incident involving explosives, whether or not there is personal injury, Control Tech must report the incident immediately to the local regulatory agency with jurisdiction, and forward a written report of the incident to same without undue delay.

Content of Written Report

The written report of the incident must contain:

- the date, time and location of the incident
- the names and certificate numbers of all blasters involved
- the names and occupations of any persons injured
- the types of explosives, detonators, and blasting machine used

- a factual account of events including the blaster's log records
- the action taken by the contractor

Blasting Logs

The blaster of record must record in a log the pre-blast loading details and the results of the post-blast site inspection. Blasting logs must be maintained at the blasting site, available for inspection by an officer, workers and worker representatives. The contractor must ensure that blasting logs are kept for at least 5 years after completion of the blasting operation. The blaster must maintain a personal log of all blasting work that the blaster has performed.

Authority to Blast

Only the holder of a valid blaster's certificate issued by the Board or acceptable to the Board is permitted to conduct or direct a blasting operation, and then only if the work involved is within the scope of that certificate.

Training

A worker engaged in loading, unloading, or conveying explosives must be trained in the proper means for handling the explosives, the hazards of fire and mishandling and the procedures to follow in the event of a fire or explosion.

Worksite Storage

Explosives at the worksite must be guarded or contained in secured day boxes until used or returned to storage magazines.

Communication

The location of a magazine in which explosives are stored, and any restrictions on access or activity around the magazine area, shall be clearly communicated to all workers.

Separate Handling

Blasting explosives and detonator products must be kept and handled separately until the last most practicable moment before bringing them together.

7.6 EMERGENCY PROCEDURES

Before explosives are transported Control Tech must ensure suitable written emergency procedures have been established and must ensure that all Control Tech workers who may be affected are adequately instructed in the procedures.

Two Fire Extinguishers requirements

A conveyance transporting explosives must be equipped with at least 2 fire extinguishers, of a type capable of quickly extinguishing gasoline, oil, or electrical fires.

Handling Explosives

Explosive materials must be stored, transported, handled and used in the manner recommended by the manufacturer.

Defective Explosives

Explosive materials or accessories which have deteriorated, or are believed to be defective, must not be used and must be handled and disposed of in a safe manner following the manufacturer's recommendations.

8.0 ELECTRICAL SAFETY

8.1 PURPOSE

The purpose of this program is to establish and implement written procedures for compliance to inform Control Tech personnel of the potential exposure to electrical hazards in operations and to provide guidelines for personnel to use when dealing with those operations.

Control Tech must ensure that all electrical equipment be installed and guarded so that adequate provision is made for the safety of persons and property and for the protection of the electrical equipment from mechanical or other injury to which it is liable to be exposed. The material in this document does not take precedence over applicable government legislation which all employees must follow.

8.2 SCOPE

This program is applicable to all workers. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech workers and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

8.3 RESPONSIBILITIES

Managers and Supervisors

- Ensure all electrical installations, equipment, apparatus and appliances shall conform to the requirements of the local, provincial and national regulatory codes.
- Ensure only approved electrical equipment is used by workers and that the electrical equipment is:
- Approved for the intended use and location of the electrical equipment
- Maintained in proper working condition and capable of safe operation
- Tested in accordance with the manufacturer’s recommendations

Employees

- Follow the requirements in the electrical safety program.

8.4 TRAINING

Electrical work may only be performed by qualified workers. Only competent, qualified electrical workers are allowed to construct, install, alter, repair, or maintain electrical equipment. Only qualified electrical workers may enter electrical rooms and enclosures containing live parts.

All employees are provided electrical awareness training. All Control Tech workers must be informed of the potential electrical hazards before being permitted to do work in proximity to energized electrical conductors or equipment.

Training will include:

- working safely with electricity
- recognition of electrical hazards
- prevention of electrical shock and arc flash
- recognition of electrical shock and arc flash hazard labels

All training must be documented and kept on file.

8.5 PROCEDURES

During Control Tech work there are times when overhead or buried lines may be present. Control Tech staff will use appropriate hazard identification and assessment methods to document hazards and corrective actions used to eliminate worker exposure to potential electrical hazards.

These operations must be performed by a qualified and authorized electrician. They shall have:

- An approved journeyman's certificate in the electrician trade issued pursuant to regulatory requirements.
- A journeyman's certificate in the power lineman trade issued pursuant to regulatory requirements.

Personal protective equipment must be worn by worker for protection from electrical shock and/or arc flash. PPE requirements within the arc flash boundary shall be determined by completing an arc flash hazard analysis. PPE must cover the entire body when working within the arc flash boundary. This may include, but is not limited to:

- arc flash suit with face shield
- safety glasses
- non-conductive head protection
- leather gloves and footwear

Rubber insulating gloves shall be worn for protection from electric shock due to inadvertent contact with an energized electrical conductor or circuit parts. CSA Z462-08 Workplace Electrical Safety

8.6 GENERAL ELECTRICAL SAFE WORK PROCEDURES

Only nonconductive hardhats are allowed for use where there is a potential for injury from electric shock or burns due to contact with energized parts.

Extension and power supply cords are maintained in a safe condition. Control Tech shall ensure that an electrical extension or power supply cord used for supplying energy to any electrical equipment:

- is approved for the intended use and location of the electrical extension or power supply cord
- is fitted with approved cord end attachment devices that are installed in an approved manner
- is provided with a grounding conductor
- is maintained and protected from physical or mechanical damage; and (e) is plugged into an approved GFCI plug adapter or GFCI receptacle (if used in a damp location)

When a portable luminaire is used, Control Tech shall ensure that the electrical extension cord and fittings are approved for the intended use and location of the extension cord and fittings and are properly maintained and the electrical extension cord is not used to supply power to any equipment other than the portable luminaire unless the cord meets the proper requirements.

All wire joints or connections are to be fitted with an approved cap or other approved cover, enclosed in an approved box or where the wire joints or connections are not permanently installed be protected from damage by another approved means and all dead, abandoned or disused electrical conductors or equipment are removed from the work area or disconnected and secured to prevent inadvertent energization.

Electrical equipment must be approved for its intended use. Only CSA approved electrical equipment and devices used in electrical installations within the jurisdiction of the local regulatory requirements shall be approved and shall be have a kind or type and rating approved for the specific purpose for which it is to be employed.

Control Tech must ensure that the path to ground from circuits, equipment, or conductor enclosures shall be permanent and continuous, shall have ample ampacity to conduct safely and currents liable to be imposed

on it, and shall have impedance sufficiently low to limit the voltage above ground and to facilitate the operation of the over current devices in the circuit.

When closing contacts at electrical control panels

- If personnel must touch anything on an electrical control panel, first check it with a voltage tester (contact or non-contact). If not available, tap it with the back of your hand. (Prevents hand from grabbing)
- Before operating switches or breakers ensure all protective panels are closed and properly fastened.
- To disconnect the electrical power from the equipment, always shut the control switch off first, before shutting the main switch off.
- To connect the electrical power, always ensure all control switches are off before engaging the master switch.
- When operating the control or master switch, never stand in front of the electrical panel. Always stand off to the side of the panel to operate the switch. Never look at the control panel. Should the panel explode, your eyes or body must not be in a direct line with the explosion.

Equipment with defective electrical components is immediately removed from service. If a defect or unsafe condition is identified in electrical equipment it shall be reported immediately and worker must mark or tag as unsafe and remove from service (e.g. damaged power cord or plug) anything that may render it unsafe for use.

8.7 LOCKOUT TAGOUT

Lockout Tagout is used before performing electrical work. Before any work begins on an electrical conductor or electrical equipment and during the progress of that work, an employer shall ensure that the electrical conductor or electrical equipment is isolated, locked out, and connected to ground. If it is not reasonably practicable to de-energize electrical equipment before performing electrical work, alternative hazard controls must be implemented and approved before electrical work begins.

Isolating devices used for safety protection guarantees must provide for visual verification of the opening of the isolation point. Lockable isolating devices must be locked in the position or condition required to protect workers before work commences under a safety protection guarantee.

A distinctive "DO NOT OPERATE" tag must be placed securely on each isolating device used for a safety protection guarantee.

If it is not reasonably practicable to de-energize electrical equipment before performing electrical work, alternative hazard controls must be implemented and approved before electrical work begins.

8.8 GENERAL FACILITY REQUIREMENTS

Control Tech shall ensure that all operating electrical equipment is kept in safe and proper working condition. Electrical equipment maintained for emergency service will be periodically inspected and tested by qualified personnel as necessary to ensure its fitness for service.

Infrequently used electrical equipment maintained for future service shall be thoroughly inspected by qualified personnel before use in order to determine its fitness for service.

Defective equipment shall either be put in good order or permanently disconnected.

Flammable material shall not be stored or placed close to electrical equipment.

Control Tech will ensure that in locations where explosive or flammable materials or gases are present, special precautions shall be observed including that repairs or alterations shall not be made on any live equipment and fits or seals in enclosures shall be maintained in their original safe condition.

8.8.1 ELECTRICAL FIRE SAFETY

Control Tech shall ensure that electrical installations shall be made so that the probability of spread of fire through fire stopped partitions, floors, hollow spaces, firewalls or fire partitions, vertical shafts, or ventilating or air-conditioning duct is reduced to a minimum. Where a fire separation is pierced by a raceway or cable, any openings around the raceway or cable shall be properly closed or sealed in compliance with the National Building Code of Canada.

Control Tech shall ensure that a fire extinguisher approved for Class C fires is readily available to workers working on or near energized high voltage electrical equipment.

Flammable materials must not be stored or placed near electrical equipment.

8.8.2 SIGNAGE, MARKINGS AND WARNINGS

Warning techniques will be used to protect workers from injury by electrical equipment.

These include:

- Safety signs or tags will be used when necessary to warn workers about electrical hazards.
- Electrical equipment such as switchboards, panel boards, industrial control panels, meter socket enclosures and motor control centres that are installed in other than dwelling units and are likely to require examination, adjustment, servicing or maintenance while energized shall be field marked to warn persons of potential electric shock and arc flash hazards. The markings shall be located so that it is clearly visible to persons before examination, adjustment, servicing, or maintenance of the equipment.
- Barricades, along with safety signs or tags, will be used where necessary to prevent or limit worker access to work areas exposing workers to exposed energized equipment. The barricades should not be conductive if the potential for electrical contact exists.
- Where signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant must be stationed to warn and protect workers.
- The entrance to a room or similar enclosure containing exposed live electrical parts shall have a conspicuous sign, warning of the danger, and forbidding entry by unauthorized persons.
- Electrical control panels have their covers permanently marked - DANGER" "HIGH VOLTAGE" and must have an approved rubber mat in front of the panel.
- Notices reading "DANGER" "HIGH VOLTAGE" shall be placed in prominent positions in proximity to energized electrical equipment, operating at over 750 volts, which may be accessible to workers.
- Where high voltage switchgear or transformers are housed, Control Tech or contractor shall post a warning sign that indicates the highest voltage in use and states that access is restricted to authorized persons only.
- All electrical panel switches must be legibly marked to indicate what they control. The markings must be durable to withstand the service environment.
- For electrical powered equipment in the shop - air compressors, fans, etc., controls must also be labelled unless the location of the switch makes it obvious what the control switch operates.

8.8.3 GUARDING

Work shall not be done in or around an area or structure in proximity to energized electrical conductors or equipment which are normally isolated by position or elevation, unless the electrical connections, conductors or equipment are provided with cabinets or guards who will effectively prevent contact by a worker, or by equipment being used or handled.

Bare live parts shall be guarded against accidental contact by means of approved cabinets or other forms of approved enclosures except where local codes exempts and cabinets or guards shall meet the specifications of an authority acceptable to regulatory authorities.

All switches, receptacles, luminaries and junction boxes shall be fitted with a cover that is approved for the intended use and location of the cover.

8.8.4 EGRESS

There shall be space around equipment. Passageways and working space around electrical equipment must be kept clear of obstructions, be arranged so as to give authorized persons ready access to all parts requiring attention, and not be used for storage.

A minimum working space of 1 metre with secure footing shall be provided and maintained about electrical equipment such as switchboards, panel boards, control panels, and motor control centres that are enclosed in metal, except that working space is not required behind such equipment where there are no renewable parts such as fuses or switches on the back and where all connections are accessible form locations other than the back.

Each room containing electrical equipment and each working space around equipment shall have suitable means of egress (walk areas, corridors, doors, etc.), which shall be kept clear of all obstructions.

Access to electrical equipment must be kept free of obstruction and allow easy access to all parts which may require maintenance.

For outdoor installations, arc producing electrical equipment shall not be installed within 1 metre from the discharge of a combustible gas relief device or vent.

8.9 EMPLOYEE EXPOSURE TO OVERHEAD POWER LINES

Where an excavation or trench is to be made in the vicinity of an overhead power line, Control Tech will ensure that the work is carried out in a manner that will not reduce the original support provided for any overhead power line pole unless permission has previously been obtained from the utility provider responsible for the overhead power line.

8.9.1 EQUIPMENT & OVERHEAD POWERLINES

Safe work practices for working within one metre of energized underground conductors are documented and all workers involved understand them. Instructions (both oral and written) should be provided by a competent person for new workers or for those who do not perform the work on a regular basis.

All equipment and machinery must maintain a safe distance from overhead hazards. The “Limits of Approach” must be adhered to when working in close proximity to power lines.

A safe limit of approach distance is maintained by workers working near energized high voltage electrical equipment.

Control Tech must accurately determine the voltage of any energized electrical equipment or conductor and the minimum distance from it required. See specific provincial Occupational Health and Safety (OHS) legislation for information on general limits of approach.

General limits of approach

VOLTAGE PHASE TO PHASE	MINIMUM DISTANCE	
	METERS	FEET
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20

Boom Movements and maintaining Safe Limits from Powerlines

Boom movement must be monitored to ensure that the safe distances are maintained. It is the responsibility of all those involved with hydrovac operations to communicate with one another when any boom movement is required in the vicinity of overhead powerlines. This includes during initial set-up or to reposition the boom.

Induction Hazards

Energized electrical conductors generate electrostatic and electromagnetic fields. As a result, working under some high-voltage lines can cause vehicles and metal objects to become electrically energized to a voltage greater than ground/earth. Review this hazard during the job planning process and establish a means to control induction. This could be by using bonding techniques or combining bonding with a method of draining the induced voltage by using a connection to an effective ground.

Blockages or Removing the Dig Tube

Periodically, rocks or other pieces of debris can become lodged in the dig tube and need to be removed to allow for a proper vacuum. Take special care if the dig tube needs to be elevated for removal of the blockage. Remove sections of the dig tube if required, but in all cases, have the signaler observe the boom movement, giving consideration to safe limits of approach.

This same consideration needs to be taken when removing the dig tube from the excavation, especially when additional sections have been added because of the depth.

Boom Position when Setting Up or Moving the Truck

Take special care to ensure that the boom has been properly stored in the cradle. The boom may not need to be stored when moving the truck very short distances or removing the boom from the cradle prior to getting the truck into a working position. Take all necessary precautions such as inspecting the surrounding area prior to moving the truck and positioning the boom so that its height is equal to or lower than it would be if it was in the stored position.

Communication between the person moving the truck and the signaler must be established and the signaler needs to be in the best position possible to monitor the truck and boom while maintain visual contact with the driver.

8.10 MARKING UNDERGROUND UTILITIES

Buried facilities must be located and marked before the ground is disturbed. Before excavating or drilling with powered tools and equipment, the location of all underground utility services in the area must be accurately determined and any danger to workers from the services must be controlled.

Call Alberta One Call to:

- Tell you which members may have underground facilities in the proposed excavation area
- Transmit the information about the proposed activity to the member companies
- Inform you about your liability and provide you with a ticket number to confirm your request
- Advise you to contact any other parties who may have underground facilities in the excavation area, as all facility owners are not members of ALBERTA ONE CALL. You must contact these non-members directly.

Buried facilities must be exposed by hand digging or other non-destructive techniques within the hand expose zones. Control Tech must ensure that work with mechanical excavation equipment is not permitted within the hand expose zone of a buried facility until the buried facility has been exposed to sight by hand digging, by a non-destructive technique acceptable to the owner of the buried facility or by an equivalent method.

Pointed tools must not be used to probe for underground gas and electrical services. Powered equipment used for excavating must be operated so as to avoid damage to underground utility services, or danger to workers.

Each member company will then contact you with information about where their facilities are buried in the proposed excavation area. **Always wait for a response from all facility owners** in the proposed excavation site before digging. Give the utility a minimum of **three full working days'** notice for planned work.

All underground utilities will be double checked during the initial locating, scoping and marking. Due to the time that can elapse from the initial locating, and marking of utilities to the job start date, the utilities within the daily construction and excavation limits will also be checked daily before the start of any construction.

The thickness of the markings should be 0.5 m. – 0.6 m. (18"-24") in length and 50 mm. (2") in width. The utility should be indicated by initials or by name in letters (150 mm. (6") high on the locate marking. On long locates the facility owner should be indicated every 100'.

If the surface over the buried line is to be removed, supplemental offset markings may be used. Offset markings should be on a uniform alignment and must clearly indicate that the actual facility is a specific distance away.

UNIFORM COLOR CODE FOR MARKING UNDERGROUND UTILITY LINES

WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Petroleum, Steam, or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

Approvals shall be received from buried facility owners prior to ground disturbance activity. Before the start of a ground disturbance activity approvals or crossing agreements must be obtained from the buried facility owner. The approval will outline the personnel responsibilities as well as any conditions or limitations for the ground disturbance activity.

Control Tech, as Ground Disturber, shall confirm that notification of the buried facility owner is complete prior to a ground disturbance activity. Before starting a ground disturbance activity, notification should be made to the Provincial One-Call centre/buried facility owner for the applicable province. The One-Call centre will notify the subscribed buried facility owners of the pending ground disturbance.

Control Tech must ensure that the initiator has accurately established the location of all underground pipelines, cables and conduits in an area where worker is to be done and shall ensure that those locations are conspicuously marked before commencing work using power tools or powered mobile equipment on an excavation, trench, tunnel, excavated shaft or borehole or before breaking ground surface with any equipment to a depth that may contact underground utilities.

Emergency response procedures are to be implemented in the event buried facilities are damaged. When unwanted contact is made with a pipe or buried facility, work should be stopped immediately and the owner (licensee) will be notified. If the owner cannot be contacted, the applicable one-call centre will be contacted.

Utilities left in place shall be protected by barricades, shoring, suspension or other means as necessary to protect employees.

Where there is contact with or damage to an underground pipeline, cable or conduit Control Tech shall **immediately notify the owner** of the pipeline, cable or conduit that contact or damage has occurred and take steps to protect the health and safety of any worker who may be at risk until any unsafe condition resilient from the contact or damage is repaired or corrected.

8.11 HAZARDOUS LOCATIONS

Hazardous locations will be classified as listed below:

Class I - Locations in which flammable gases or vapours are or may be present in the air in quantities sufficient to produce explosive gas atmospheres.

Class II - Locations in which there is a presence of combustible dusts or electrically conductive dusts.

Class III - Locations in which there is a presence of easily ignitable fibres but in which such fibres are not likely to be in quantities sufficient to produce ignitable mixtures.

Where ever reasonably practicable no electrical equipment or devices shall be used or installed within hazardous locations unless the equipment is essential to the process being carried on therein.

Control Tech will ensure the use or installation of electrical devices is essential within a hazardous location, only electrical equipment rated and approved for use by local regulatory code with the specific gas, vapour, mist or dust hazard which may be present within the hazardous location shall be used.

Service equipment, panel boards, switchboards, and similar electrical equipment shall, where practicable, be located in rooms or sections of the building in which hazardous conditions do not exist.

Tools and other equipment that are capable of conducting electricity and endangering the safety of any worker shall not be used in such proximity to any live electrical installation or equipment that they might make electrical contact with the live conductor.

Electrical equipment shall be adequately ventilated to prevent the development around electrical equipment of ambient air temperatures in excess of those normally permissible for such equipment.

Adequate illumination shall be provided to allow for safe operation and maintenance of electrical equipment.

Control Tech facilities will have the necessary equipment to Lockout and Tagout breakers.

8.11.1 USE OF PORTABLE ELECTRIC EQUIPMENT

Portable equipment must not be handled in any way that would cause damage. Electrical cords cannot be used for raising or lowering equipment or be fastened by staples or otherwise hung in a manner which could cause damage to the outer insulation.

Extension cords and cords on equipment must be visually inspected before use or at the beginning of each shift to determine if the damage (loose parts, deformed or missing pins, damage to the outer cover or insulation, or pinched/crushed outer jacket) exists. A visual inspection is not required if equipment/cords remain connected and are not exposed to damage. All defective or damaged cords and equipment must be removed from service immediately until repaired and tested if they might expose a worker to injury.

Grounding type cords must be used with grounding type equipment. Receptacles and plugs must be checked prior to connection. Receptacles and plugs must not be altered in a manner which would prevent proper continuity and adapters cannot be used which defeat the grounding connection of equipment. Cord-connected electrical equipment and tools shall have a casing that is adequately grounded.

Portable electrical equipment used outdoors or in damp locations is equipped with ground fault circuit interrupters (GFCI). When used outdoors or in a wet or damp location, portable electrical equipment, including temporary lighting, must be protected by an approved ground fault circuit interrupter of the class “A” type installed at the receptacle or on the circuit at the panel, unless another acceptable means of protection is provided.

Employee’s hands must be dry when plugging or unplugging energized equipment. Also, if energized plugs or receptacles are wet or could otherwise provide a conducting path, only insulating protective equipment may be used for handling the connection devices.

8.12 EMERGENCY PROCEDURES

The following emergency procedures shall be required as training to be completed and are to be followed if a person comes in contact with exposed energized electrical equipment and that contact may affect his or her safety or health -

8.12.1 CONTACT WITH NORMAL ELECTRICAL CURRENT

1. Don't touch the victim unless the power is off.
2. Unplug the equipment or turn the power off at the main control area.
3. If you can't turn off the power, use a dry wooden board or broom handle to separate the victim from the power source.
4. Call for emergency medical assistance.
5. If the victim is not breathing, perform mouth-to-mouth resuscitation, if trained.
6. If the victim is conscious, keep them calm. Lay them on their back. Elevate their feet. Cover them with a blanket.

8.12.2 CONTACT WITH HIGH VOLTAGE LINE

1. Don't try to separate the victim from the power source.
2. Don't touch the victim unless you are absolutely certain the victim is not in contact with electrical wire.
3. Call for emergency help and medical assistance.

8.12.3 ELECTRICAL FIRE

1. Unplug the burning or smoking appliance.
2. Get everyone out at once.
3. If the fire is small, use a CO2 or dry powder fire extinguisher. Never put water on an electrical fire.
4. Call for emergency assistance or the fire department. Tell the dispatcher your name, address, and that you have an electrical fire.

9.0 ELECTRICAL - ASSURED EQUIPMENT GROUNDING

9.1 PURPOSE

The purpose of this program is to provide procedures and guidelines to eliminate all injuries resulting from possible malfunctions, improper grounding and/or defective electrical tools. This program applies to all sites, employees and contractors and shall be used on owned premises. The material in this document does not take precedence over applicable government legislation which all employees must follow.

9.2 SCOPE

This program applies to all Control Tech utility workers and all Control Tech locations in Alberta.

9.3 RESPONSIBILITIES AND DUTIES

Supervisors

- Designated as competent persons for the assured equipment grounding conductor program
- Responsible for program execution
- Designated (as defined in OHS legislation) to implement and execute the program

Employees

- Follow the requirements of this program, to perform visual inspections and to take defective equipment out of service.

9.4 DEFINITIONS

Competent Person - is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Ground Fault Circuit Interrupter - a device for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

9.5 SAFE WORK PLANNING

PROCEDURES AND GUIDELINES TO ELIMINATE INJURIES FROM POSSIBLE MALFUNCTIONS, IMPROPER GROUNDING AND/OR DEFECTIVE ELECTRICAL TOOLS

The following procedures and guidelines are designed to eliminate all injuries resulting from possible malfunctions, improper ground and/or defective tools.

Assured Grounding Site Program Requirement

An assured grounding conductor program must be implemented on all Control Tech sites covering all cord sets, receptacles which are not part of the building or structure & equipment connected by cord and plug which are available for use or used by employees.

Ground Fault Circuit Interrupters

All 120-volt, single-phase 15 and 20 ampere receptacle outlets on construction or maintenance sites, which are not part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground fault circuit interrupters for personnel protection.

- All hand portable electric tools and extension cords shall use a GFCI.
- Additionally, approved GFCI's shall be used for 240-Volt circuits in the same service as described above.
- GFCI's must be used on all 120 volt, single-phase 15 amp and 20 amp receptacles within 6 feet of a sink, damp areas or on installed outdoor equipment.
- The GFCI must be the first device plugged into a permanent receptacle.
- The GFCI must be tested before each use.

Assured Equipment Grounding Conductor Program

The Assured Equipment Grounding Conductor Program (AEGCP) shall cover all cord sets, receptacles not a part of the permanent wiring of a structure and equipment connected by cord and plug on all construction and maintenance sites.

This written description of the program shall be kept at the jobsite for inspection and copying by OHS and any affected employee.

Restrictions for Use of Equipment that Does Not Meet Requirements

Restrictions for the use of equipment that does not meet requirements or if is found to be defective shall be applied and enforced. Any equipment which has not met the requirements of this program shall not be available or permitted to be used by Control Tech. Damaged items shall not be used until repaired. If the equipment is not fit for purpose it shall be destroyed or tagged and isolated from use.

How Often Inspection of Cords and Equipment are to be Made

Daily Visual inspections – The following shall be visually inspected before each day's use for external defects (such as deformed or missing pins or insulation damage) and for indication of possible internal damage:

- Cord sets;
- Attachment caps;
- Plug and receptacle of cord sets;
- Any equipment connected by cord and plug (with the exception of cord sets and receptacles which are fixed and not exposed to damage) such as deformed or missing plug, and
- Insulation damage
- Damaged items shall not be used until repaired or shall be discarded.
- Damaged items shall be tagged "DO NOT USE", removed from service until repaired and tested.

How and When Tests are Performed and What Records are Maintained

All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductors. The equipment grounding conductor shall be connected to its proper terminal.

When tests are performed:

- Before each use.
- Before equipment is returned to service following any repairs.
- Before equipment is used such as when a cord has been run over.
- At intervals not to exceed 3 months, except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

Tests performed as required by this program shall be recorded as to the identity of each receptacle, cord set and cord and plug connected equipment that passed the test and shall indicate the last date tested or interval for which is was tested. This record shall be kept by means of logs, color coding or other effective means and shall be maintained until replaced by a more current record. These records shall be made available at the job site for inspection by the Assistant Secretary and any affected employees.

All tested cord sets and cord and plug-connected equipment shall be marked, one or both ends, with colored tape to denote the month that the tests were performed. The below color code chart that must be followed for marking.

1 MONTH	MONTH	COLOR OF TAPE TO APPLY TO CORDS
2	January	Red
3	February	Yellow
4	March	Green
5	April	Blue
6	May	Brown
7	June	White
8	July	Start Over with Red and repeat

10.0 ELECTRICAL - UTILITIES SAFETY

10.1 PURPOSE

The purpose of this program is to provide guidance for operations involving underground or overhead electrical equipment in Alberta. The material in this document does not take precedence over applicable government legislation which all employees must follow

10.2 SCOPE

This program applies to all Control Tech utility workers and all Control Tech locations in Alberta.

10.3 RESPONSIBILITIES AND DUTIES

The safety manager is responsible for developing procedures for utility work at each Control Tech work site. The site manager is responsible for implementing the requirements and training at their location. The supervisors are responsible for enforcing the provisions of this section of the safety manual. All workers are responsible for following these provisions.

General Duties of Employers as Described in the Alberta Electrical Utility Code

Control Tech shall address the general duties of employers as described in the Alberta Electrical Utility Code. This program demonstrates that all requirements are met. Control Tech shall:

- Ensure that a copy of the safety rules are available to each Control Tech employee
- Ensure that each Control Tech employee has received instruction in the application of the safety rules
- Take reasonable steps to ensure that each Control Tech employee complies with the requirements of the safety rules and
- Ensure that each Control Tech employee is qualified to perform work in accordance with the safety rules and in accordance with the Control Tech employee's ability.

General Duties of Utility Employees as Described in the Alberta Electrical Utility Code

Control Tech utility employees must follow the safe work procedures developed by the power producer. An industrial power producer must implement written safe work procedures that are made available to Control Tech employees and ensure all work performed by Control Tech utility employees is in accordance with the safe work procedures.

A Control Tech utility employee shall:

- Become familiar and comply with the safety rules,
- Comply with the operating procedures established by the employer,
- Comply with procedures covering the application of protective grounding established by company,
- Warn persons seen in danger near electrical equipment or lines and
- Heed and obey warnings and signs issued or used in accordance with the requirements of the Alberta Electrical Utility Code.

Control Tech utility employees must not approach, or allow conducting objects or equipment to approach, closer than the safe limit of approach to exposed energized parts distances listed in Table 4-1 of the Alberta Electrical Utility Code. A Control Tech utility employee shall not approach, or allow conducting objects or equipment to approach, exposed energized electrical equipment or lines closer than the limit of approach distances to exposed energized parts specified in Table 4-1, Column 4 of the Alberta Electrical Utility Code.

General Duties of a Qualified Utility Employee in Charge

A qualified utility employee in charge of work shall:

- require that the safety rules are observed by employees working under the qualified utility employees direction,
- maintain all required records,
- communicate with the operator-in-charge when required by the operating procedures,
- as far as reasonably possible prevent unauthorized persons from approaching places where work is being done and hazardous conditions exist and
- prohibit the use of any tools or devices unsuited to the work

Work on energized equipment or lines is performed by a minimum of 2 qualified employees. Where live line work is performed on electrical equipment or lines, a minimum of 2 qualified Control Tech utility employees shall be used to perform the live line work.

10.4 SAFE WORK PLANNING

10.4.1 SITE VISIT PREPARATION

A site visit is required to assess electrical hazards. Consider all electrical utilities to be live with the potential of causing serious injury or death. Contact with electrical equipment (i.e. overhead line or buried cable) must be avoided at all cost. In developing a site work plan consider such factors as:

- Scope of work
- Type of excavation, hoisting or other equipment that will be required
- Height and reach of the equipment
- Equipment placement
- Equipment or material loading/unloading
- Worker competency
- Soil condition
- Interruptions to electrical services
- Hazard to public
- Use of ladders, pipe and other conducting materials
- Need to notify electric utility owner
- Need to communicate all hazards to all workers including contractors or sub-contractors
- Changing conditions
- Other hazards present (i.e. gas or chemicals)

10.4.2 EXCAVATING

Control Tech shall ensure that the locations of all buried electrical cables are marked before work begins on any excavation. Arrangements to have this done can be made through **Alberta One-Call at 1-800-242-3447.** At least two full working days notice is required.

Before using mechanical equipment within one meter of the locate marks, the buried electrical cables must be exposed, using non-destructive excavation techniques acceptable to the electrical utility. If the locate marks have been tampered with or if Control Tech does not begin work within fourteen days of the date locates were done, request relocates through Alberta One-Call.

In excavation planning, overhead electrical equipment must also be identified and controlled. Utility pole bases or other electrical equipment foundations and systems must not be exposed or damaged during excavation. Other considerations in safe work planning for excavation in the vicinity of buried electrical equipment include:

- Arranging to meet locators at site
- Marking locations of all buried electrical equipment on plans and drawings
- Reviewing locate slips before excavating
- Posting warning signs along the buried electrical equipment corridor
- Planning location of spoil piles so as not to reduce clearances to power lines

10.4.3 OVERHEAD ELECTRICAL EQUIPMENT

Overhead power lines or wires are the electrical equipment contacted most often. The operator of overhead power lines or communication lines shall ensure that the lines are installed and maintained to permit the safe movement under the lines of equipment, buildings or objects not exceeding the following heights:

- 3.6 m for areas normally accessible to pedestrians only
- 4.1 m for driveways to residences or residential garages
- 4.2 m for areas where agricultural equipment is normally used
- 4.3 m for right-of-way of underground pipelines
- 4.8 m for lanes, alleys or entrances to commercial or industrial premises
- 5.3 m for roads and highways

Unqualified persons must never attempt to measure clearances to power lines.

Operating Voltage of Overhead Power Line Between Conductors	Safe Limit of Approach Distance for persons and Equipment
0 - 750 V Insulated or polyethylene covered conductors (1)	.3m
0 - 750 V bare, uninsulated	1.0m
Above 750 V Insulated Conductors (1)(2)	1.0 m
0.75 kV - 40 kV	3.0 m
69 kV, 72 kV	3.5 m
138 kV, 144 kV	4.0 m
230 kV, 240 kV	5.0 m
500 kV	7.0 m

Other considerations in safe work planning for work near overhead electrical equipment include:

- Marking location of all overhead power lines on plans and drawings
- Posting warning signs along their route
- Using a designated signaller
- Marking of the power lines to make them visible to the equipment operator
- Physical guarding of the overhead power lines
- Marking the limits of approach on the ground using a brightly coloured ribbon or rope.

Request the local utility to:

- Move the overhead power lines
- Shut off the power to overhead power lines
- Cover the overhead power lines with electrical protective equipment
- Remove the automatic reclosing feature of power lines

10.4.4 EMERGENCY RESPONSE PLAN

The emergency response plan must be reviewed with the workers to ensure that if a contact occurs, every worker knows what to do. The site specific emergency response plan should include:

- Knowing what to do if equipment becomes energized
- First aid
- Public protection
- Notification of authorities
- Availability and communication with emergency responders
- Medical aid beyond first aid

10.4.5 PPE REQUIREMENTS FOR EMPLOYEES WORKING ON ENERGIZED ELECTRICAL EQUIPMENT

A utility employee working on or near energized electrical equipment shall wear:

- clothing next to the skin made of non-melting natural fibres, such as wool or cotton or of other acceptable fire retardant material,
- other clothing made with at least 65% natural fibres,
- no metallic articles in contact with the skin,
- approved industrial protective headgear and
- a long sleeved garment with the garment sleeves rolled down.

10.5 CRANES, EXCAVATION AND OTHER EQUIPMENT

Aerial devices are equipped with upper and lower controls and an operator is present at ground level. Where live line work is performed on electrical equipment or lines aerial devices shall be equipped with both upper and lower controls and where an aerial device is used to perform the work an additional Control Tech utility employee, qualified to operate the lower controls, shall be present at the work site at ground level.

Whenever machinery is being used near electrical equipment all workers in the vicinity shall be instructed to remain clear and out of contact with the frame of the equipment, hoisting lines or the hoisted load, except to attach or detach the load.

The height, width and maximum reach of the equipment shall be known by the operator of the machine. This information is available on the machine data sheet.

When working near electrical equipment "Keep clear - working near electrical lines and apparatus" signs will be displayed on the exterior of machines.

A notice giving the following shall be posted in the cabs of machines working near electrical equipment:

- The limits of approach to overhead power lines for persons and equipment
- The machine shall not be moved near electrical equipment without the aid of a signaller
- Maximum height and reach of the machine with the boom or bucket fully extended
- (Machine Data Sheet) shall be posted in view of the operator of the machine.

A signaller shall alone direct the moving of equipment near overhead power lines or other electrical equipment. The signaller shall be identified by a bright traffic vest and/or cuff.

The designated signaller shall not be assigned any other duties during the times when the equipment is near the limits of approach.

The important consideration in signalling is that the signaller and operator understand each other completely and communicate effectively.

The signaller shall know the limits of approach distances to overhead lines and ensure that at no time is there a limit of approach encroachment.

10.6 ACCIDENTAL CONTACT

10.6.1 EFFECTS OF ELECTRICAL CONTACTS

In an electrical emergency it is important employees know to stay calm and think before acting. Burns are the most common electrical related injury. Electricity can cause severe burns at points of entry and exit. Although entry and exit wounds may be small, bone and muscle can be extensively damaged.

Electrical contact passing through the heart can cause the heart to stop beating. The effects of an electrical contact are determined by how much current is flowing through the body (measured in amperes and determined by voltage and resistance) and the path of the electricity - where it enters and exits the body.

10.6.2 EQUIPMENT IN CONTACT WITH ELECTRICAL CONDUCTOR

If the equipment makes accidental contact with an electrical conductor, the operator shall try to remove the machine from contact in the best possible manner, without causing further damage such as pulling power lines to the ground. In most cases, this can be accomplished by moving the boom of the machine. If the machine cannot be moved, the operator shall stay on the machine, warn others in the vicinity to stay clear of the machine and ask someone to notify the electric utility.

Remove the bucket from the ground in the case of an underground contact.

Keep out of the excavation and do not touch the cables.

The operator should leave the machine only as a last resort; if the machine is on fire or other such emergency.

If the operator has to leave a machine that is in contact with an electrical conductor, the operator must jump clear. He must NOT, under any circumstances, step down and allow part of his body to be in contact with the ground while any other part of this body is touching the machine. Because of the hazardous voltage differential in the ground the operator should jump with his feet together, maintain balance and shuffle or hop slowly across the affected area, as far away from the machine as possible (at least 10 meters).

Do not take large steps because it is possible for one foot to be in a high voltage area and the other to be in a lower voltage area. The difference between the two can kill.

Once safely away from the machine and conductors, the operator has the following responsibilities:

- Protect others by warning them and not allowing them to approach the energized equipment
- Call the Electric Utility for help and to shut off the electric power
- Notify the appropriate Government Departments

10.6.3 MOVING OR LIFTING WIRES

High voltage wires or other equipment can be handled safely only by someone who is trained and has special equipment and tools designed for high voltage.

Control Tech utility workers will never attempt to move or raise an electrical conductor with a board or stick or ever approach or touch an electrical conductor that is lying on the ground, as it may be energized or become energized. If possible, the area should be barricaded or guarded to prevent injury.

10.7 FIRST AID

10.7.1 CARE OF A CASUALTY IF INJURED

Once a victim is no longer in contact with electricity and medical help has been called, the responder will check the following:

- Breathing - If the victim is not breathing, use artificial respiration immediately.
- Pulse - Check for pulse and begin CPR if required.
- Shock - Signs include cold or clammy skin, weak, shallow breathing, rapid pulse. Loosen clothing, keep victim horizontal and warm until help arrives. Cover with a blanket if one is available.
- Burns - Avoid handling the affected area or removing burnt clothing. Don't use gauze, or any material that is likely to stick to the wound.

11.0 ENVIRONMENTAL - GENERAL WASTE MANAGEMENT

11.1.1 PURPOSE

The purpose of this waste management strategy was developed to provide guidance and requirements necessary for efficient, effective and compliant waste management during construction and operations. The material in this document does not take precedence over applicable government legislation which all workers and/or subcontractors must follow.

11.1.2 SCOPE

This procedure applies to all Control Tech employees. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

11.1.3 PROCEDURE

The Control Tech Safety Manager or other designated person in his or her absence is accountable for managing waste and disposition of wastes generated at the work site.

11.1.4 WASTE ESTIMATION

Each work site will estimate the waste, trash and/or scrap that will be generated and taken into consideration prior to work being performed so the need for containers and waste removal, if necessary, can be determined.

Each site will utilize the following for planning of dumpster scheduling and total non-hazardous dry waste material. Control Tech must coordinate with the project site or owner to ensure proper disposal of wastes or scrap materials.

Control Tech must ensure the owner client is aware of whether wastes and scrap materials will be taken off site by Control Tech or will be disposed of on the owner client's site.

11.1.5 WASTE SEGREGATION

- Do not mix waste streams
- Only place waste in the designated container, satellite accumulation area (SAA), recyclable accumulation area (RCA), universal waste accumulation area (UWAA) or designated dumpster.

11.1.6 RECYCLING

Wastes should be recycled whenever practicable. Control Tech will encourage proper segregation of waste materials to ensure opportunities for reuse or recycling occurs at each work site. The collection of recycled material will reduce the total load on the environment. Bins of sufficient size must be lined with a plastic bag and clearly labeled for use. Posters from Control Tech will be posted throughout the work site to encourage recycling.

Collection bins will also be placed in administrative areas will follow the following color guiding:

- Blue - Paper
- Green - Aluminum cans
- Yellow - Plastic

Cardboard will be flattened, staples and excess shipping tape removed. No cardboard shall be placed in the dumpster used for the landfill.

11.1.7 WASTE HANDLING MATRIX

Each work site will develop a Waste Handling Matrix (sample shown) that will:

- Address safe practices related to the immediate storage and handling of waste, scrap or leftover material.
- The handling, organization and storage of waste and scrap materials to minimize potential impact to the environment. Waste materials shall be properly stored and handled to minimize the potential for a spill or impact to the environment. During outdoor activities receptacles must be covered to prevent dispersion of waste materials and to control the potential for runoff.

11.1.8 STORAGE REQUIREMENTS

Control Tech must ensure project related wastes are stored and maintained in an organized fashion to encourage proper disposal and minimize risks to employees. Proper waste receptacles must be provided for trash and materials that may be reused or recycled during a project.

11.1.9 PPE

For each site waste management plan Control Tech shall determine a PPE matrix that includes gloves, hand protection, eye and face protection and/or other necessary PPE.

11.1.10 EDUCATION AND TRAINING

Employees shall be instructed on managing waste generated at the work site and on the proper disposal method of wastes. Examples include:

- Instruction on the proper handling, storage and disposal of wastes and depending on the waste generated at the site to also include general instruction on disposal of non-hazardous wastes, trash or scrap materials. If wastes generated are classified as hazardous then employees shall be trained to ensure proper disposal and compliance with regulations.
- Minimization methods to reduce waste and recycling methods and proper PPE to be utilized.

WASTE STREAM	LOCATION	HAZARDOUS NON HAZARDOUS	SAFE STORAGE PRACTICE	DISPOSAL METHOD	PPE OR OTHER PRECAUTIONS
Automotive and Heavy Equipment Parts-Used	Equipment Repair Shop and Fab Shop	Non-Hazardous	RAA's by equipment repair shop	Returned to vendors for recycling	Starters, Alternators, Pumps, Transmissions
Batteries (Alkaline)	Various Locations	Universal Waste	Place in the UWAA in the equipment repair shop	"D" cell and below are acceptable in the Non-Burnable Waste Dumpster	Ship to designated site for recycling or disposal
Batteries (Lead Acid)	Equipment Repair Shop and Fab Shop	Universal Waste	No storage allowed. Containment boxes are labeled and available in the shops.	Lead acid batteries are returned to the Vendor upon removal	Ship to designated site for recycling
Batteries (Nicad)	Various Locations	Universal Waste	UWAA in the equipment repair shop.	Ship to assigned site for recycling or disposal	Cell phones, radios
Cardboard/Office Paper	Parts Department & Offices	Non-Hazardous	RAA in the Hog Barn	Place on pallet in RAA and band for shipment to assigned site for recycling.	Gloves
Computers Discarded	Parts Department & Offices	Non-Hazardous	Place in RAA	Ship to assigned site for recycling or disposal	Gloves
Diesel Filters-Used	Equipment Repair Shop and Fab Shop	Non-Hazardous	RAA for drained and crushed used filters	Drain for 12 hrs., crush and incinerate in Smart Ash unit	Place metal in recycle metal dumpster
Diesel Rags	Various Locations	Non-Hazardous	Oily waste rag in clear bags w/yellow stripes.	Ship to assigned site for recycling or disposal	Gloves
Drained Diesel	Equipment Repair and Fab Shop	Non-Hazardous when burned as off-Spec fuel	Place in "used oil" tank in the equipment repair shop and fab shop.	Ship to assigned site for recycling or disposal	Gloves
Empty Paint Cans	Various Locations	Non-Hazardous	No storage allowed	Ship to assigned site for recycling or disposal	Paint cans must be RCRA empty.
Fluorescent Light Ballast	Various Locations	Non-Hazardous unless they contain PCB's or DEHP	None	Place in Non-Burnable Dumpster	Ballast will say on the label if it contains PCB's

12.0 ENVIRONMENTAL - SPILL PREVENTION & RESPONSE

The purpose of this plan is to direct individual who work with hazardous substances and required documentation in the spill prevention and response requirements. Each Control Tech work site will develop a spill prevention and response plan based on the requirements and template provided. When work is performed on a site under the control of a prime contractor, the prime contractor program shall take precedence.

12.1 DEFINITIONS

Hazardous waste Incident or spill - an unplanned, uncontrolled discharge of gas, liquid or solid materials from any contained or closed system e.g. (truck debris tank) that may adversely impact the environment).

Incident - an occurrence either human caused or by natural phenomena, that requires action by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Contingency Plan - a detailed program of action to control and/or minimize the effect so fan emergency requiring prompt corrective measures beyond normal procedures to protect human life, to minimize injury, to optimize loss control, and to reduce the exposure of physical assets and the environment to risks resulting from an incident.

Emergency - in the context of these guidelines, an accidental situation involving the release or imminent release of hazardous waste that could result in serious adverse effects on the health and/or safety of persons or the environment.

Hazard -an event with a potential for human injury, damage to property, damage to the environment, or some combination thereof. Hazardous Waste has the prescribed meaning from Section 1 of the Hazardous Waste Regulation

Risk - the chance of a specific undesired event occurring within a specified period or in specified circumstances. It may be either a frequency or a probability of a specific undesired event taking place.

Risk Identification - the identification of undesired events that lead to the materialization of a hazard, the analysis of the mechanisms by which these undesired events could occur and, usually, the estimation of the extent, magnitude, and likelihood of any harmful effects.

Risk Assessment - a quantitative estimation of the likelihood of undesired events occurring and the likelihood of harm or damage being caused by them, together with the value judgments made concerning the significance of the results. Risk

Frequency - the number of occurrences per unit of time.

Risk Management - the program that embraces all administrative and operational programs that are designed to reduce the risk of emergencies involving acutely hazardous materials. Such Programs include, but are not limited to, ensuring the design safety of new and existing equipment, standard operating procedures, preventive maintenance, operator training, incident investigation procedures, risk assessment for unit operations, emergency planning, and internal and external procedures to ensure that these programs are being executed as planned.

Spill - a release or discharge into the environment, not authorized under the Act, of a substance In the Spill Reporting Regulation in a quantity equal to or greater than the quantity listed.

12.1.1 SPILL PREVENTION AND RESPONSE PLAN REQUIREMENTS

Each work site spill prevention and response plan shall contain the following:

Chemical substances should be stored in proper containers to minimize the potential for a spill. Whenever possible, chemicals should be kept in closed containers and stored so they are not exposed to storm water.

The program must identify chemicals used that may be potentially spilled or released. This will include both liquid chemicals used at our facilities or brought on to owner client sites.

Spill response materials or spill kits must be readily available for any anticipated spills. Spill kits must be adequate for any anticipated spills. A proper spill kit must contain the appropriate supplies for materials that may be spilled. Supplies must be easily accessible when required, and considerations must be made for both the type and quantity of materials.

The contents of spill response kits shall be periodically assessed to ensure the availability of adequate spill response supplies and adjust inventory as necessary.

Control Tech shall ensure the availability of adequate spill response supplies by periodic inspection to assess their availability and adjust the inventory as necessary.

Employees must be instructed on spill prevention and the proper response procedures for spilled materials. The training should include materials available for use, proper waste disposal and communication procedures.

Areas where chemicals may be used or stored must be maintained using good housekeeping best management practices. This includes, but is not limited to clean and organized storage, labeling and secondary containment where necessary.

Proper communication measures for employees to initiate in the event of a spill will be created on a site by site basis. Communication procedures will be based on type and quantity of materials spilled.

Environmental spills shall be reported to environmental authorities when required. Reporting procedures will be based on type and quantity of materials spilled.

12.1.2 SPILL PREVENTION

Plan Management

The primary contact or designee shall administer the site plan and will be responsible for updating and including any required documentation.

General Requirements

- Ensure all hazardous substances are properly labeled
- Store, dispense, and/or use hazardous substances in a way that prevents releases
- Provide secondary containment when storing hazardous substances in bulk quantities
- Maintain good housekeeping practices for all chemical materials at the facility

Training

Employees are provided training on spill prevention and response procedures. All personnel who may respond to any spill, need to be trained on the contents and procedures in this plan. Trained personnel will add their names and dates of training to the Training Log. Only persons trained on this plan shall respond to a spill. If you are not trained and witness a spill, call or notify the primary and secondary contacts listed in this plan.

Spill Tracking

Any spills must be entered into the Spill Log. If a large catastrophic spill occurs, attach additional pages to describe the event. Include known or possible causes, areas affected, and effectiveness of the cleanup. Include a review of the cleanup contractor and their procedures. For small spills, it is sufficient to fill out the Spill Log, and to take measures to prevent a repeat occurrence.

Facility Inspections

Routine/Daily checks in the hazardous substance storage area to be performed. Routine inspections will be conducted daily during regular business hours. Daily inspections will include, at a minimum, a visual inspection of the hazardous substances containers and the area immediately adjacent to it for signs of a spill or leak. These inspections do not need to be logged unless a spill or leak is detected. Ideally, these inspections will be conducted by a manager or by regular employees.

Full site inspections will be conducted monthly by the primary contact or designee and, at a minimum, will include those items on the inspection form. If any item on the inspection form is found unacceptable, the inspection form will be attached to this plan. If all items are deemed acceptable; it is sufficient for the inspector to log only the inspection and the results in the Inspection Log.

Equipment & Supplies Inspections

All Spill Kits will be inspected at least twice per calendar year or after use to ensure that each kit is appropriately located, sound and contains the requisite material in a usable condition.

Emergency Equipment such as fire extinguishers & first aid kits are completed monthly.

12.2 EMERGENCY RESPONSE TO SPILLS

Response Action Decisions

Three levels of emergencies may be identified as follows:

LEVEL I: minor spills requiring only the driver to respond and take necessary actions.

LEVEL II: intermediate level spills requiring response by a driver or off-site trained staff but posing no immediate danger to the public or harm to the environment. Media may be present.

LEVEL III: a major incident beyond the resources of Control Tech, where there are subsidiary problems to complicate the situation such as fire, explosion, release of toxic compounds that threaten safety of life and community water supplies, property and the environment. Assistance will be required from local, regional, and/or provincial organizations. The media will likely be present.

Plan Activation and Response Mobilization

The person in possession, charge or control of the spilled substance at the time of the spill to take all reasonable and practical action to stop, contain and minimize the effects of the spill.

Upon receiving initial notification of an incident involving release of hazardous waste into the environment, the first responder on-scene will assess the magnitude of the problem and potential threat to personnel, equipment, public safety and the environment. If the situation warrants, the operations manager will activate the plan. Situations will be assessed on their own merit to develop an appropriate response strategy.

The following steps must be adhered to when dealing with all environmental spills.

Initial Response

STAY CALM
APPROACH CAUTIOUSLY FROM UPWIND OR UPSTREAM
& CHECK

Be absolutely sure you know what chemical/s you are dealing with before you take any action to control the situation, and that you are not at risk.

Check reportable quantities: as per the spill reporting regulations (Reportable Spill Quantities)

Refer to SDS (Safety Data Sheet) for information on PPE and cleanup requirements.

Level I:

1. Do not touch or walk through spilled material.
2. Assess the situation and identify hazards. (review load ticket, SDS, North American Emergency Guide Book
3. Insure personal safety by maintaining a safe distance.
4. Secure the truck away from drains or any type of water way.
5. Ensure public safety
6. Be absolutely certain you KNOW what MATERIAL/S you are dealing with!
7. Don appropriate Personal Protective Equipment. (GLOVES, GOGGLES, RUBBER BOOTS, OTHER PPE.)
8. Prevent any materials from entering drains, (liquids or solids).
9. Use spill kit, plug rugs and absorbent booms to contain the spill.
10. Clean up spill

Level II:

1. Do not touch or walk through spilled material.
2. Assess the situation and identify hazards. (review load ticket, SDS, North American Emergency Guide Book (ERP 2012)
3. Insure personal safety by maintaining a safe distance.
4. Secure the truck away from drains or any type of water way.
5. Ensure public safety
6. Be absolutely certain you KNOW what MATERIAL/S you are dealing with!
7. Don appropriate Personal Protective Equipment. (GLOVES, GOGGLES, RUBBER BOOTS, OTHER PPE.)
8. Prevent any materials from entering drains, (liquids or solids).
9. Use spill kit, plug rugs and absorbent booms to contain the spill.
10. Mobilize the appropriate resources to isolate the hazard as much as possible and to implement "first aid" remedial actions.

Level III:

1. Assess the situation and identify hazards. (review load ticket, SDS, North American Emergency Guide Book (ERP 2012) casualties?
2. Identify the location of incident and the area of immediate risk and the potential for escalation.
3. Raise the alarm, alert the local, provincial and federal emergency services and activate the appropriate warning system.

4. Mobilize the appropriate resources to isolate the hazard as much as possible and to implement "first aid" remedial actions.
5. Initiate procedures for the protection of personnel, property, the public and the environment.
6. Implement procedures for the protection of vital resources, continuity of traffic and security of the property and records.
7. Activate emergency communications links. Notify senior personnel of the company, the appropriate agencies and potentially affected parties in the area as appropriate.
8. Liaise with officers of the emergency services and with other senior personnel as they arrive at the location of incident, and cooperate as required.
9. Call for further assistance as may be necessary.
10. Keep informed of developments and ensure that the means of giving and receiving information, advice and assistance are functioning effectively, including those related to public relations.
11. As appropriate, implement approved procedures for rehabilitation of the location of incident and the local impacted environmental components (land and water).

Response action/Containment/Cleanup

1. Once the release or spill is controlled and the area has been determined safe for entry, clean-up may then proceed.
2. Always wear appropriate personal equipment before commencing.
3. For liquid spills use appropriate spill absorbent kits (oil or chemical type).
4. The degree of contamination and site clean-up may have to be addressed with technical support from the office and engineering.
5. Dispose of spent or used absorbent materials, PPE and other hazardous wastes that was collected in specially identified containers plastic bags, steel or plastic drums.
6. These must be disposed into special waste receiving facilities with appropriate manifests.
7. The Dispatch Office will arrange for disposal of the reclaimed spilled waste containers.
8. The extent and toxicity of the spilled material will determine the decontamination requirements

12.2.1 INITIAL RESPONSE TABLE

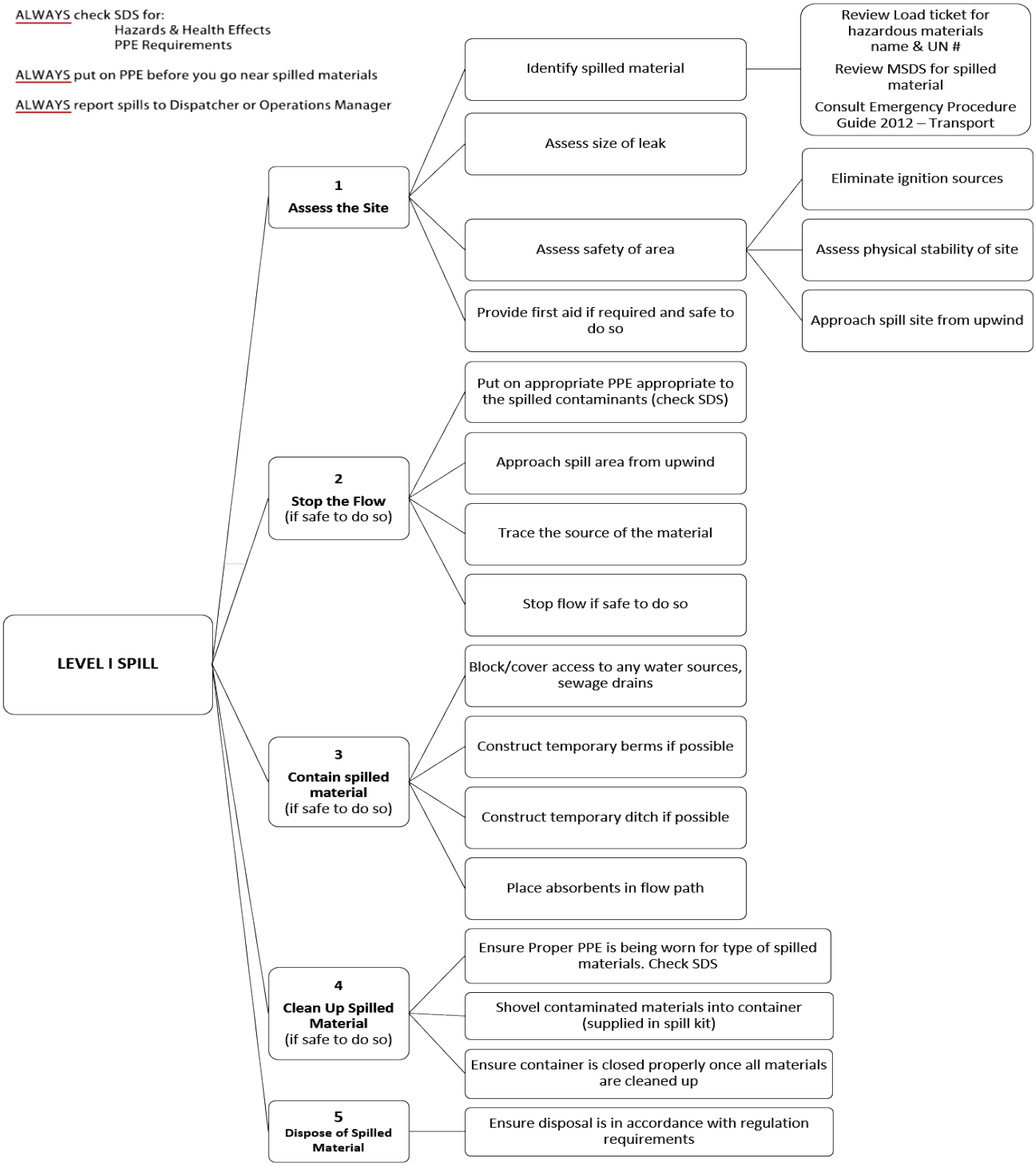
STEP	SUMMARY	DETAILS
1	**APPROACH SPILL**	**APPROACH CAUTIOUSLY FROM UPWIND, UPHILL OR UPSTREAM:** • Stay clear of Vapor, Fumes, Smoke and Spills • Keep vehicle at a safe distance from the scene
2	**SECURE THE SCENE**	• Isolate the area and protect yourself and others • Eliminate all ignition, heat and power sources
3	**IDENTIFY THE HAZARDS**	**IDENTIFY THE HAZARDS USING ANY OF THE FOLLOWING**: • Placards • Container labels • Shipping documents • Vac Truck Identification Chart • Safety Data Sheets/Safety Data Sheets (SDS/SDS) • Knowledge of persons on scene

		• Consult applicable guide page in ERG 2012
4	**ASSESS THE SITUATION**	**ASK YOURSELF QUESTIONS & RECORD INFORMATION TO RELAY TO DISPATCH** • Is there a fire, a spill or a leak? • What are the weather conditions? • What is the terrain like? • Who/what is at risk: people, property or the environment? • What actions should be taken – evacuation, shelter in-place or dike? • What resources (human and equipment) are required? • What can be done immediately?
5	**OBTAIN HELP**	• Report to dispatch/Spill Coordinator • Specified representative will notify responsible agencies (if applicable) and Co-ordinate spill team
6	**RESPOND**	• Enter only when wearing appropriate protective gear • Rescue attempts and protecting property only if safe to do so. (must be weighed against you becoming part of the problem) • Establish a command post and lines of communication • Continually reassess the situation and modify response accordingly • Consider safety of people in the immediate area first, including your own safety **EVACUATE** • Co-ordinate spill team • Determine safe zone • Evacuate all non-spill team persons **ISOLATE** • Eliminate all ignition, heat and power sources **CONTAIN** • Follow instructions on SDS/SDS or ERP 2012 • Cover any drains in area and divert spill away from water source if possible • Use appropriate Spill Kit for product type and amount of spill. • Contain spill from spreading with granular or absorbent socks.
6	**CLEAN UP / DISPOSAL**	• Dispose of according to product SDS/SDS instructions • Use spark proof and chemically compatible equipment to clean up • Pick up absorbed material with shovel and place in disposal bag or container. • All pads, granular, socks, non-reusable gloves, clothing, etc. should be placed in disposal container.
7	**DECONTAMINATE**	• Remove soiled or contaminated clothing & gloves • (Never touch clean clothes or materials with contaminated gloves or materials)

ALWAYS check SDS for:
Hazards & Health Effects
PPE Requirements

ALWAYS put on PPE before you go near spilled materials

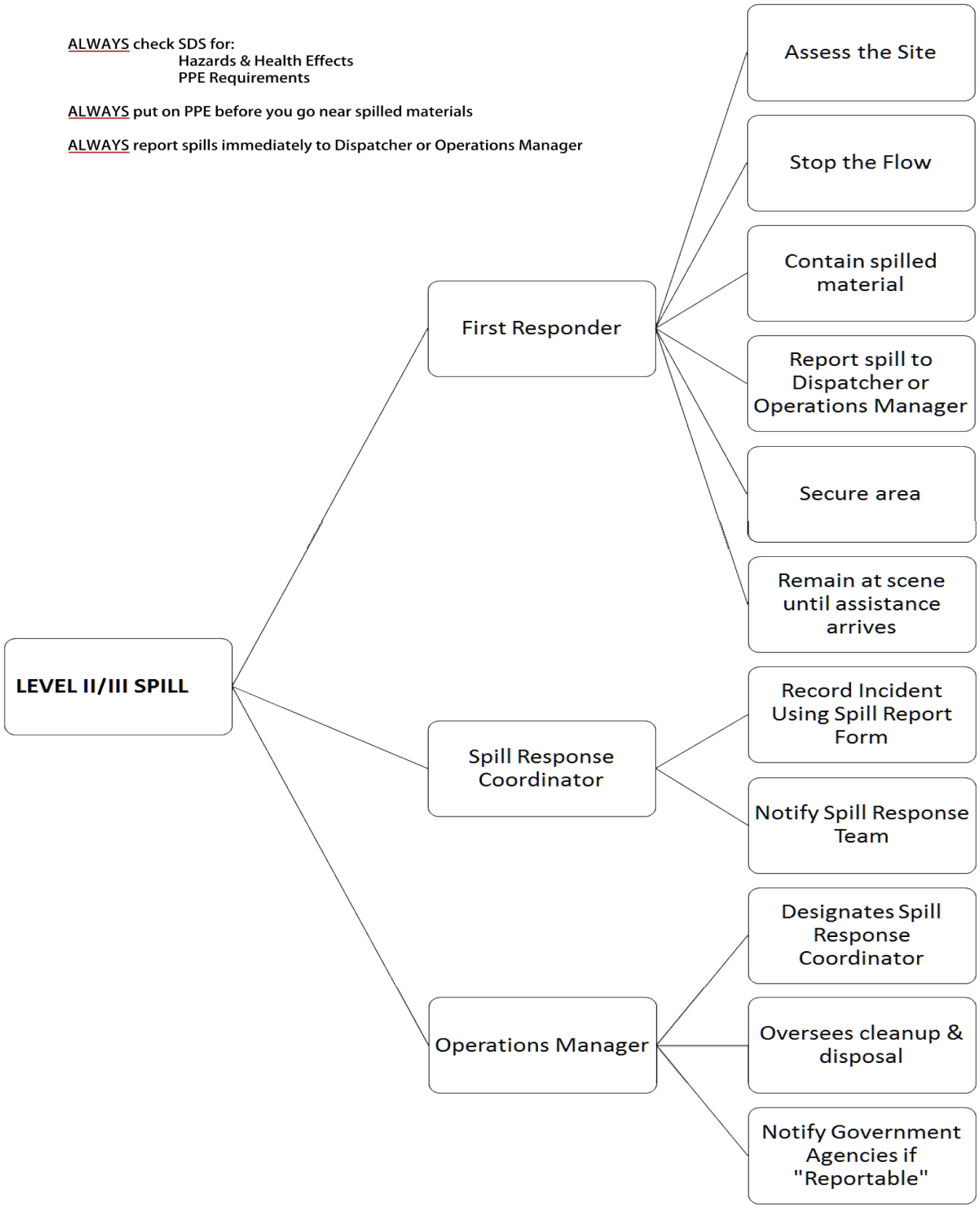
ALWAYS report spills to Dispatcher or Operations Manager

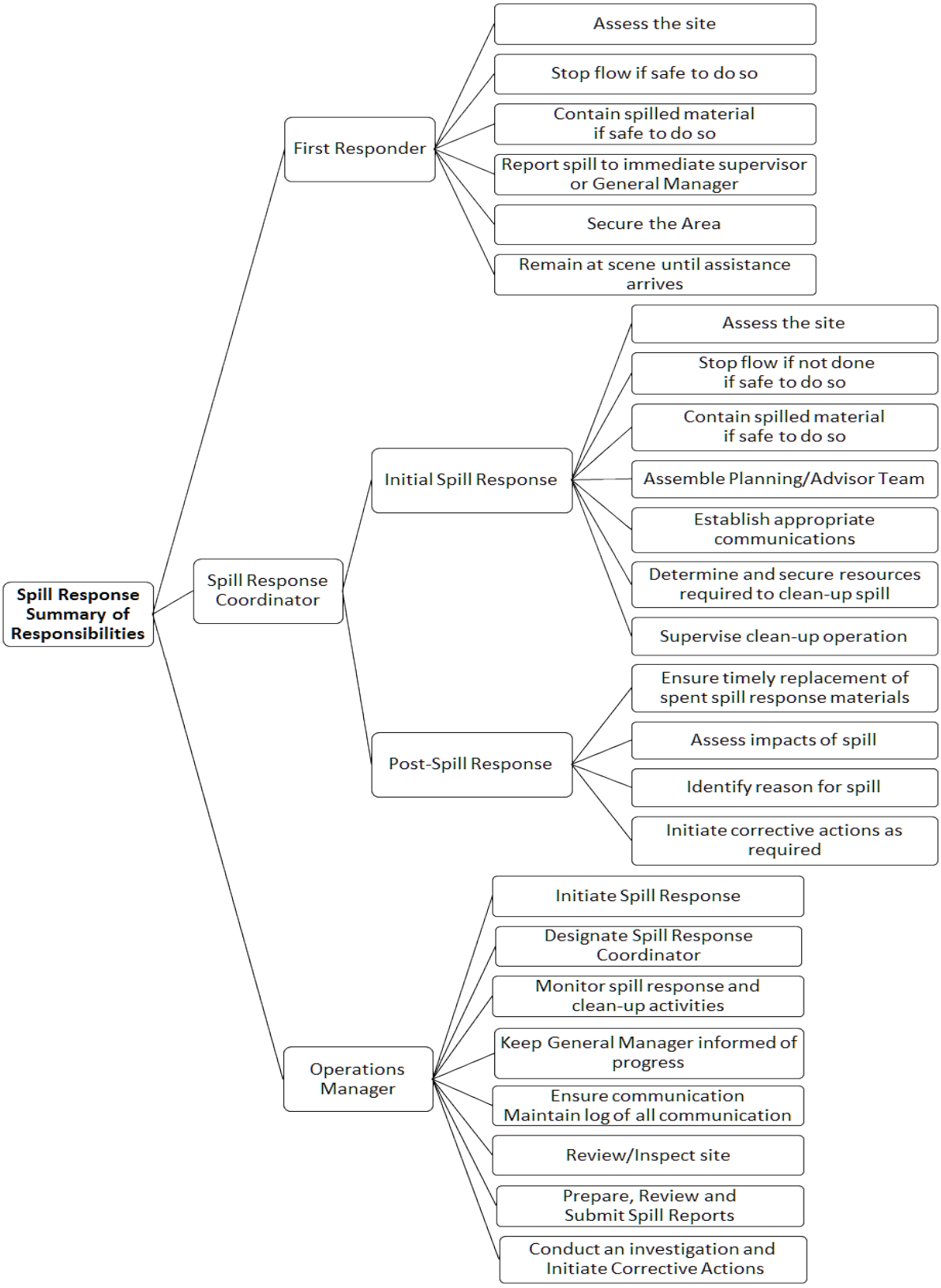


ALWAYS check SDS for:
Hazards & Health Effects
PPE Requirements

ALWAYS put on PPE before you go near spilled materials

ALWAYS report spills immediately to Dispatcher or Operations Manager




Spill Response Summary of Responsibilities
First Responder
Assess the site
Stop flow if safe to do so
Contain spilled material if safe to do so
Report spill to immediate supervisor or General Manager
Secure the Area
Remain at scene until assistance arrives
Spill Response Coordinator
Initial Spill Response
Assess the site
Stop flow if not done if safe to do so
Contain spilled material if safe to do so
Assemble Planning/Advisor Team
Establish appropriate communications
Determine and secure resources required to clean-up spill
Supervise clean-up operation
Post-Spill Response
Ensure timely replacement of spent spill response materials
Assess impacts of spill
Identify reason for spill
Initiate corrective actions as required
Operations Manager
Initiate Spill Response
Designate Spill Response Coordinator
Monitor spill response and clean-up activities
Keep General Manager informed of progress
Ensure communication
Maintain log of all communication
Review/Inspect site
Prepare, Review and Submit Spill Reports
Conduct an investigation and Initiate Corrective Actions

12.2.2 EVACUATION

Situations which would warrant partial or complete evacuation are as follows:

- Explosions resulting in airborne debris including container fragments and hazardous waste.
- Spills or chemical reactions resulting in toxic fumes.
- Fire when it cannot be contained and is spreading, or when fire could generate toxic fumes.
- All incidents where necessary protective equipment is not available to emergency response personnel.

Evacuations will be ordered and managed by the emergency response services (RCMP, Fire Department) if necessary.

Evacuation Stages

1. Evacuation Order: Public is at risk. Leave the area immediately. Local police or RCMP enforce evacuation orders.
2. Evacuation Alert: Be ready to leave on short notice. If you leave before or during this alert, it's called a voluntary evacuation.
3. Evacuation Rescinded: All is currently safe and you can return home. Stay tuned for other possible evacuation alerts or orders.

12.2.3 DISPOSAL OF SPILLED CONTAMINANTS AND DEBRIS

Dispose of spent or used absorbent materials, PPE and other hazardous wastes that was collected in specially identified containers plastic bags, steel or plastic drums. These must be disposed of in special waste receiving facilities with appropriate manifests.

In small and moderate spills Control Tech office will arrange for pickup & disposal of the reclaimed spilled waste containers in accordance with Environmental legislation, the Hazardous Waste Regulation and the Contaminated Sites Regulation.

Site Restoration/Remediation

Once the release or spill is controlled and the area has been determined safe for entry, clean-up may then proceed. Always wear appropriate personal equipment before commencing.

For small to medium liquid spills use appropriate spill absorbent kits (oil or chemical type). The degree of contamination and site clean-up in small to moderate spills may have to be addressed with technical support.

Restoration can include physical removal of contaminated surface materials, high-pressure washing, chemical cleaning, replacing of contaminated soil materials, restocking of lakes, and bioremediation. Only personnel who have the appropriate qualifications should be allowed to perform site evaluation and site restoration. _____ is Control Tech's 1st Call Emergency Response Company for large spills. They are qualified to clean up all types of product spills that may occur in Control Tech.

_____, in consultation with Control Tech and the government regulatory agency will take the required action to restore the affected environment to the pre-spill conditions.

12.2.4 POST-INCIDENT EVALUATION

The primary purpose of the post-incident evaluation is to identify from the spill response operation the weaknesses or strengths of the Emergency Spill Response Plan and to make appropriate corrections to the plan. Other uses for post-incident evaluation may include accounting, legal, and public relations matters. Post-incident evaluations are completed on both training exercises and actual emergency incidents.

The post-incident evaluation includes the following:

- Suitability of the organization structure, equipment, communication system, etc.
- Adequacy of training, alarm systems, contingency plan manual, control centre, communication plans, security, spill containment and recovery procedures, monitoring, etc.
- Appropriateness of the spill response action plan, media communications plan, etc.

A systematic approach to incident investigation and analysis is essential to an effective Spill Response Emergency Spill Response Plan. Control Tech ensures procedures for reporting, investigating and evaluating incidents and non-conformances in order to prevent further occurrences.

All incidents are investigated. The investigation will take place as soon as possible after the incident occurs and senior management reviews and evaluates root causes and contributing factors. All incident investigations must be documented. The written Investigation Report shall include any immediate corrective actions that were taken as well as any long-term actions that are required to prevent the recurrence of the incident.

12.3 REPORTING REQUIREMENTS

Control Tech Personnel

Trained and qualified people are available to assist where needed. First contacts in case of an emergency spill situation:

Control Tech Emergency Response	**24/7**	**000.000.000**

In the event of an environmental emergency or occurrence, such as an oil or chemical spill, federal and provincial/territorial authorities need to be notified in order to coordinate an adequate oversight of the response. Since environmental emergencies or occurrences are often local in nature and in order to reduce notification burden, the Canadian environmental notification system uses the following federal-provincial/territorial 24-hour authorities as the first point of contact. Environmental emergencies include hazardous or toxic spills, discharges, emissions, as well as dyke and dam failures, debris flows and floods.

The Operations Manager, in consultation with the Spill Response Coordinator and the Spill Response Planning/Advisory Team, will be responsible for preparing the Spill Reports for review and submission.

Conduct an investigation to identify the reason for spill (natural, technical or human causes).

Based on the results of that investigation, initiate corrective actions as required in order to reduce the potential of a repeat occurrence.

Assessing the impacts of the spill and its cleanup and determining, in consultation with Nucor Environmental Solutions, whether any ongoing monitoring is required.

In the event that ongoing monitoring is required, the Operations Manager /Advisory Team will be responsible to ensure the conduct of such monitoring is done in a safe manner and by qualified and capable people.

Prepare the Accident/Incident Report.

Post Spill Response

a. Conduct an investigation
    - Identify reason for spill – Natural, Mechanical, Human
b. Initiate corrective actions as required

12.3.1 ENVIRONMENT REPORTING CONTACTS

PROVINCE	AUTHORITY
Alberta	911 (or local police) and relevant provincial authorities (1-800-272-9600) or Canadian Coast Guard (1-800-889-8852)
British Columbia	911 (or local police) and Provincial Emergency Program (1-800-663-3456) or Canadian Coast Guard (1-800-889-8852)
CANUTEC	1-888-CAN-UTEC (226-8832), 613-996-6666, or *666 on a cellular phone
Canadian Nuclear Safety Commission	CNSC duty officer emergency line (613-995-0479)
Natural Resources Canada	613-995-5555

12.4 RESOURCES

Control Tech maintains a network of response resources which includes internal and external equipment and personnel.

Supplies & Equipment

EQUIPMENT & SUPPLIES	
IN EACH TRUCK	**ON LOCATION**
Spill Response Kits (Spill Kits) Each of these spill kits is clearly labelled and contains, but may not necessarily be limited to: • 1 roll absorbent • 2 plug and dyke kits • 1 –3 m x 4 m tarpaulin • 2 pairs of disposable coveralls • 4 mini booms(optional) • 100 spill pads • 1 bag of corncob absorbent; • 1 bag of multi-zorb fire retardant granular for aviation stations (helipad and airstrip); • 2 pair of neoprene gloves [i.e. POL (petroleum/oil/lubricants) resistant] • 2 sets of splash proof POL resistant goggles • 1 collapsible shovel • 10 disposable waste bags and ties • (contact waste management for drums to contain clean-up • materials) • A copy of the Spill Kit First Responder Insert (see Appendix A). Other response supplies & equipment include: • Communication Device – cell phone • Multi Gas Monitor • Fire Extinguisher	• Spill Kits & additional refill supplies • Fire Extinguishers • First Aid Kits • Warning Triangles • Warning tape • Shovels • Absorbent pads, pillows, or loose sorbent • Disposable Berms • PPE (Personal Protective Equipment): additional PPE (Personal Protective Equipment) is always kept in stock in case required by drivers or responders. • Disposal bags, bins, etc. Additional Supplies & Equipment is always kept in stock in case required by drivers or responders.

• First Aid Kit • Warning Triangles • Warning tape • PPE (Personal Protective Equipment): safety boots, glove, protective eye wear, face shields, rubber or "Tyvec" suits and respirators as required to protect yourself. • Spill Response Contingency Plan • North American Emergency Guide Book 2016	

Each truck is equipped with emergency equipment including a fire extinguisher, first aid kit, Gas Monitors & warning triangles and pylons as well as reflective barrier tape in case of spill.

Every truck is equipped with a shovel and spill kit (yellow bag) that contains personal protective equipment, absorbent material and liquid flow drain mats to control the flow of unwanted release of liquid pollutants into storm or other catch basins.

Drivers are to always wear appropriate PPE (Personal Protective Equipment) (personal protective equipment) to protect against exposure while loading and unloading as well as for specific spill exposure injuries. (i.e.) safety boots, glove, protective eye wear, face shields, rubber or "Tyvek" suits and respirators as required to protect yourself.

Each truck also contains the Spill Response Contingency Plan, a copy of the North American Emergency Guide Book 2016, SDSs received at time of loading.

Emergency response vacuum trucks are available through Control Tech to lend assistance in event of a spill. Additional spill kits, emergency equipment available as required in the event of a spill.

Produces and distributes biodegradable waste disposal products for septic system maintenance.

The suppliers that Control Tech uses for their Spill, Emergency & Safety Equipment & supplies include:

12.5 TRAINING AND PRACTICE DRILLS

Training of all Control Tech employees to familiarize them with the Spill Emergency Spill Response Plan and testing the plan's elements through mock spill exercises is critical to ensuring the success of the plan. Training and training exercises prepare personnel, evaluate the responder's, (named in the plan) ability to respond to a spill and demonstrate to government and to the public that there is adequate preparation should a spill occur.

On-site training at Control Tech commences with every employee during their initial site orientation. At that time, every employee is informed that he/she is potentially a First Responder to any spill or unanticipated discharge event and is provided a brief explanation of the actions expected of every First Responder and where to find the First Responder (flow chart) which is included in the site spill kits. This orientation also includes:

- location of this contingency plan & its contents
- the emergency contact lists
- location and usage of site specific emergency response equipment and resources

All drivers/operators are required to complete TDG and WHMIS training. Training is completed through BC Trucker Association, online courses through Enviro Safety, Control Tech Safety meeting discussions reviewing practices & procedures.

Additionally, more detailed training is provided to select supervisory individuals on a regular basis by a Control Tech designated service provider. (Designated Spill Coordinators, Operations Manager, etc.) The instructional sessions include staff responsibilities under the Hazardous Waste Regulations, site safety, materials properties and strategies as well as tactics for containment and recovery in-facility, on land and on water spills. Training of staff helps ensure that hazardous waste is transported or shipped in compliance with BC Regulations.

These training programs ensure that all Control Tech personnel understand the procedures in the Control Tech Spill Emergency Spill Response Plan, the hazards of the materials stored on-site, who is responsible for what activities, where to find response equipment and how to operate it, and how to obtain outside resources.

Practice Drills

Additional on-site drills & training is provided to a wider employee-base annually by a qualified spill response consultant, which includes the performance of mock spill response exercises under typical operating conditions in conjunction with instructional sessions. At a minimum all affected driver/operators, subcontractors and emergency/spill responders must attend.

The objectives of a drill (practice exercise) include evaluation of the following:

- practicality of the plan (structure and organization)
- adequacy of communications and interactions among parties
- emergency equipment effectiveness
- adequacy of first aid and rescue procedures
- adequacy of emergency personnel response and training
- public relations skills
- evacuation and personnel count procedures

12.6 PLAN EVALUATION

The Control Tech Emergency Spill Response Plan will be reviewed, at a minimum, once per calendar year and revised as required to ensure all information is kept current.

Besides the annual review, if changes occur during the year the contingency plan must be reviewed, and immediately amended, whenever the following situations apply:

- applicable regulations are revised
- the plan fails in an emergency
- changes or additions to equipment (changes to design, construction, operation, maintenance, or other circumstances)
- the list of emergency coordinators or their contact information changes
- emergency response services and/or their contact numbers change
- the list to emergency equipment changes.

12.6.1 PLAN UPDATES

When changes are made to the Emergency Spill Response Plan, those changes will be recorded on the Emergency Spill Response Plan Amendment Register below. All plan holders must acknowledge receipt of the changes at the time they receive the changes. It is the responsibility of the safety manager to ensure that all plan holders are notified of any changes as soon as possible as well as ensuring acknowledgements that each plan holder received the changes.

Plan holders will be notified immediately of any key changes regardless of review period.

12.7 RECORD KEEPING

Records of the following documents and information are kept on file for inspection by ministry staff and other authorities as well as for the Control Tech's reference:

Load/transport documents: shipments of hazardous wastes that are dangerous goods need both a manifest prepared according to the HW Regulation and a shipping document prepared according to the TDG Regulations all waste in the load. These documents will be filled out and handed into office and retained at principle place of business. Other records that need to be retained are:

Plan updates and revisions including:

- revision numbers
- dates
- revising personnel
- approving management personnel and authorities

Record of training including:

- names of staff
- dates of training
- content of training
- training provider

Record of drill and practice exercises including:

- Dates
- Staff involved
- Equipment used
- Extent of exercises

Record of plan evaluation including:

- Dates
- Staff involved in evaluation
- Documentation

Record of incidents and near misses including:

- Staff Names
- Dates
- Details of Occurrence
- Agencies Involved
- Completed Incident & Investigation Reports.

13.0 ERGONOMICS / MANUAL MATERIAL HANDLING

13.1 PURPOSE

Control Tech is committed to providing a safe and healthy working environment for all employees. The material in this document does not take precedence over applicable government legislation which all employees must follow.

13.2 RESPONSIBILITIES

Designated Safety Representative

Develop local Lifting and Handling Programs for all worksites in accordance with this procedure and ensures all employees are aware of the requirements of the Lifting and Handling Program.

Responsible for the review, implementation and maintenance of the local worksite Lifting and Handling Program including:

- Communicate, promote and support the Lifting and Handling Program.
- Conduct MSI training sessions and/or provide MSI training materials.
- Maintain records of MSI training that they provide in a manner that supports accuracy and ease of access for monitoring purposes.
- Prepare and analyze MSI incident statistics and provide to HSCs and Control Tech management or consultants.
- Monitor corrective actions taken as identified on incident reports.
- Support supervisors and the worksite JHSC in the Lifting and Handling Program process.
- Assist in the investigation of MSI incidents to address injury hazards.
- Bring to the attention of Control Tech management any MSI hazards identified during their investigations, audits or inspections.
- Ensure distribution and awareness of MSI Hazard Identification Forms.
- Provide input into purchasing specifications for new tools, equipment and furniture as needed to reduce MSI hazards.
- Provide input into the development of safe work procedures to reduce MSI hazards.

Worksite Project Manager

- Responsible for the implementation and maintenance of the Lifting and Handling Program for their site and ensures all assets are made available for compliance with the procedure.
- Ensure that all worksite departments implement and maintain the provisions of the Lifting and Handling Program.
- Seek regular reports to ensure that their worksite is in compliance with the Lifting and Handling Program.
- Communicate, promote and support the implementation of the Lifting and Handling Program.
- Provide equipment for lifting and handlings loads.

Employees

- Shall attend all MSI related training for the task they are performing.
- Practice MSI prevention strategies as per MSI training.
- Comply with safe work procedures.
- Correctly use the equipment provided by Control Tech, according to manufacturers' recommendations.
- Report to the supervisor any unsafe acts, unsafe tasks, unsafe conditions or equipment problems that create MSI hazards.

- Report any MSI incidents to the supervisor and cooperate in the investigation process.
- Provide suggestions to supervisors and/or the JHSC for their review regarding MSI prevention or control measures, e.g., purchasing specifications for equipment and furniture.

13.3 TRAINING

Control Tech must ensure that a worker to be assigned to work which requires specific measures to control the risk of MSI is trained in the use of those measures.

Workers are provided ergonomics training. A worker who may be exposed to a risk of MSI is educated in risk identification related to the work, including the recognition of early signs and symptoms of MSIs and their potential health effects.

Control Tech must ensure that a worker to be assigned to work which requires specific measures to control the risk of MSI is trained in the use of those measures, including, where applicable, work procedures, mechanical aids and personal protective equipment.

Training will include:

- Identification of factors that could lead to a musculoskeletal injury
- The early signs and symptoms of musculoskeletal injury and their potential health effects,
- Preventive measures including, where applicable, the use of altered work procedures, mechanical aids, and personal protective equipment.
- The recognition, evaluation, and prevention of adverse health effects resulting in Musculoskeletal Disorders (MSI)
- Reporting related symptoms and injuries.
- In the use of specific control measures Control Tech is taking to minimize MSI including altered work procedures, mechanical aids and personal protective equipment for the work they are assigned to.
- Any revision to the Ergonomics
- The lifting, holding or transporting of loads in safe methods of manually lifting, holding or carrying of loads, heavy or otherwise.

A worker who is to engage in the lifting, holding or transporting of loads receives appropriate training in safe methods of manually lifting, holding or carrying of loads.

13.4 INDIVIDUAL WORKSITE REQUIREMENTS

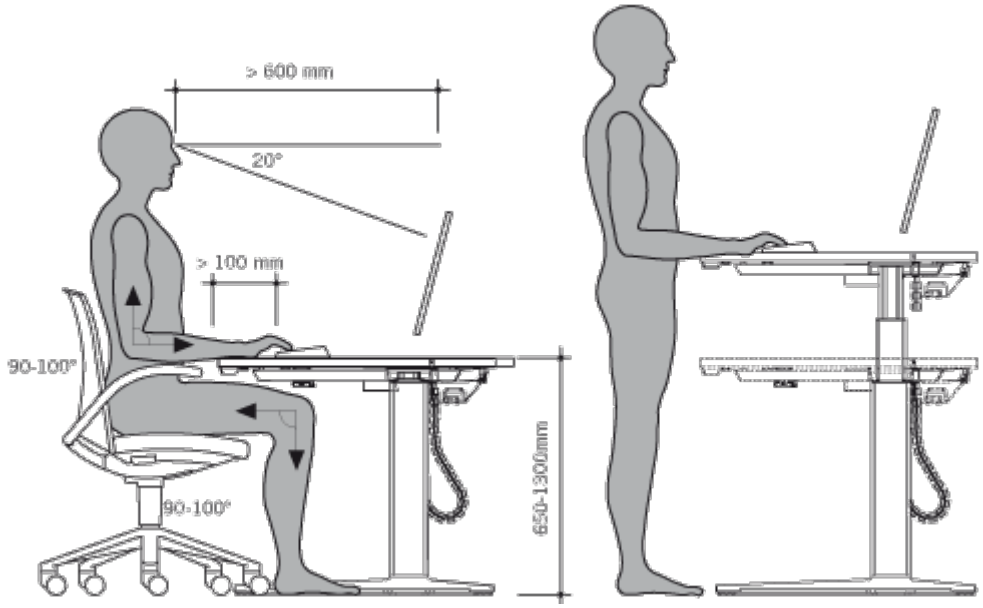
Control Tech must implementation of control measures to reduce the risk of musculoskeletal injuries.

Control Tech must eliminate or, if that is not practicable, minimize the risk of MSI to workers. Personal protective equipment may only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable. The employer must, without delay, implement interim control measures when the introduction of permanent control measures will be delayed.

Control Tech requires each worksite to establish and maintain a Lifting and Handling Program with the following elements:

- Ongoing training of management, supervisors, and employees (including new hires) on MSI awareness hazards and control measures
- Training of specialized staff (designated Control Tech Representative, JHSC members) on MSI hazard assessment and control measures
- Tracking of MSI statistics
- MSI hazard identification and assessment (see MSI Hazard Identification form)
- Control of MSI hazards through the application of engineering and/or administrative controls

- Implementation of the local Lifting and Handling Program by incorporating MSI principles into the purchasing process, i.e., by proactively integrating ergonomics principles into purchasing equipment and furniture
- Proactively integrating ergonomics principles into workplace design and work techniques
- Ongoing evaluation (no less than annually) of the local Lifting and Handling Program implementation and effectiveness
- A realization that personal protective equipment may only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable.



13.5 WORKSITE HAZARD ASSESSMENT

Each worksite shall identify and assess risk factors that may expose employees to a risk or contribute to musculoskeletal injury. A hazard assessment must be performed before manually lifting and handling a load or transports a load that could injure a worker. Before a worker manually lifts, lowers, pushes, pulls, carries, handles, or transports a load that could injure the worker, an employer must perform a hazard assessment that considers:

- the weight of the load
- the size of the load
- the shape of the load
- the number of times the load will be moved
- the manner in which the load will be moved

13.6 CONTROL MEASURES TO REDUCE THE RISK OF MUSCULOSKELETAL INJURIES

Control measures must be implemented to prevent musculoskeletal disorders. Where the equipment, work procedure, or working condition in a work area has caused injurious inflammation of muscles, tendons or the upper limbs of the persons doing the work, and it is demonstrated to be from repetitive or forceful use, Control Tech shall, where practicable, implement one or more of the following preventive measures:

- modification of work procedures or equipment to reduce physical demands on affected body areas, or

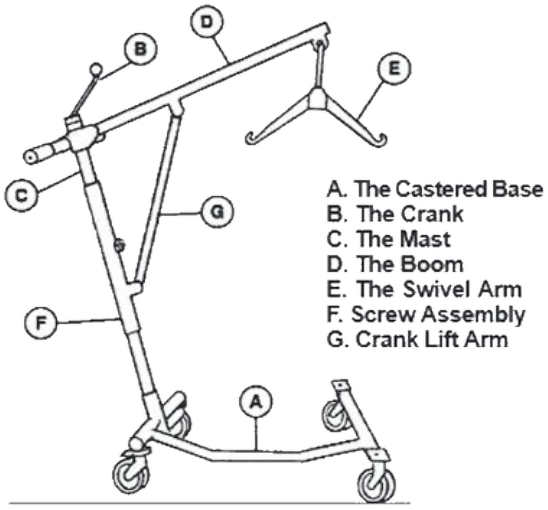
- a rescheduling of work to permit safe adjustment to unaccustomed task requirements

Control Tech must monitor the effectiveness of any control measure implemented to eliminate or reduce the risk of musculoskeletal injury and where the monitoring identifies that a risk of musculoskeletal injury is not being or has not been eliminated or reduced, implement further control measures, where it is reasonably practicable to do so.

Personal protective equipment may only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable. Control Tech must, without delay, implement interim control measures when the introduction of permanent control measures will be delayed.

13.6.1 EQUIPMENT

Mechanized equipment should be used for material handling, whenever practicable. Where reasonably practicable, appropriate equipment for lifting, lowering, pushing, pulling, carrying, handling or transporting heavy or awkward loads in order to minimize the hazards of manual lifting for the workers.



13.6.2 HANDLING HEAVY OR AWKWARD LOADS

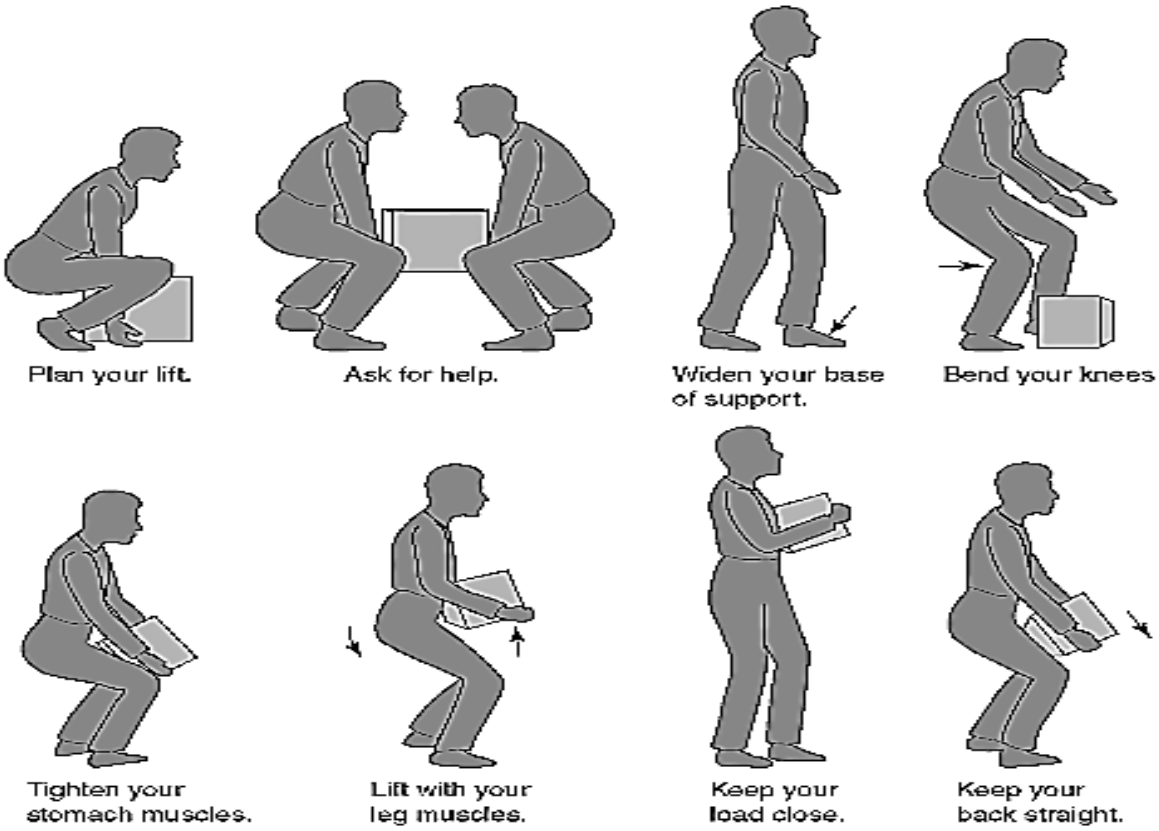
Control Tech shall ensure, where reasonably practicable, that suitable equipment is provided and used for the handling of heavy or awkward loads. Where use of equipment is not reasonably practicable, Control Tech shall take all practicable means to adapt heavy or awkward loads to facilitate lifting, holding or transporting by workers, or to otherwise minimize the manual handling required.

- Employees shall not attempt to lift more than they can comfortably taking and absolutely not more than 18kg without assistance from another employee or use of mechanical aids (pallet jack, hand dolly, etc.) to lift the load.
- All loads carried on handcarts shall be secured.
- All awkward loads shall be secured to prevent tipping.

Additional methods include:

- reducing the weight of the load by dividing it into two or more manageable loads
- increasing the weight of the load so that no worker can handle it and therefore mechanical assistance is required
- reducing the capacity of the container

- reducing the distance the load must be held away from the body by reducing the size of the packaging
- providing hand holds
- team lift the object with two or more workers
- improve the layout of the work process to minimize the need to move materials
- reorganize the work method(s) to eliminate or reduce repeated handling of the same object
- rotate workers to jobs with light or no manual handling
- use mobile storage racks to avoid unnecessary loading and unloading



13.7 REVIEW & UPDATING

Each worksite will review the effectiveness of the Ergonomics Program at least annually. Any injuries will be reviewed for MSI and Ergonomics for deficiencies and those factors must be corrected without delay.

<u>If an employee reports symptoms of a MSI Control Tech will:</u>

- Promptly review the activities of the employee and of other employees doing similar tasks to identify work-related causes of the symptoms. Use the Musculoskeletal Injury (MSI) Report Evaluation Form in this procedure.
- To identify work related causes of the symptoms, if any and to take corrective measures to avoid further injuries if the causes of the symptoms are work related.
- Revise the Lifting and Handling Program where applicable

Any revision must involve retraining of employees as soon as corrective actions are implemented.

14.0 FALL PROTECTION / WORKING AT HEIGHTS

14.1 PURPOSE

The purpose of this program is to provide fall protection procedures to prevent injury to workers while performing work assignments at elevated levels. The material in this document does not take precedence over applicable government legislation which all employees must follow.

14.2 SCOPE

This procedure applies to all managers, supervisors, forepersons, employees, subcontractors, and visitors of Control Tech jobsite. When work is performed on a site under the control of a prime contractor, the prime contractor program shall take precedence.

14.3 RESPONSIBILITIES

Operations Manager

- It is the responsibility of the work site operations manager (designated competent person) to implement this Fall Protection Program. Continual observational safety checks of work operations and the enforcement of the safety policy and procedures shall be regularly enforced. All jobs shall be pre-planned prior to the start of work.

Supervisor

- Supervisors shall make exposure determinations and shall discuss with their workers the extent to which scaffolds, ladders or vehicle mounted work platforms can be used.
- Ensure that fall protection equipment is available and in safe working condition.
- Provide for emergency rescue in the event of a fall. Pre-plan the job to ensure that workers have been properly trained in the use, limitations, inspections and rescue procedures and that training records are on file.

Employees

- Understand the potential hazards of working at elevated levels as well as gaining access to and from the work location.
- Understand the use and limitations of such equipment.
- Pre-plan the job with his/her supervisor to agree that the job can be done safely.
- Before using a lifeline or lanyard, a worker shall ensure that the lifeline or lanyard is free of imperfections, knots and splices other than end terminations, is protected by padding where the lifeline or lanyard passes over sharp edges and is protected from heat, flame or abrasive or corrosive materials during use.
- Before using a safety belt or full body harness a worker shall ensure that the safety belt or full body harness is properly adjusted to fit the worker securely and is attached by means of a connecting linkage to a fixed anchor or lifeline.
- Inspects the connecting linkage, personal fall arrest system, full-body harness or lifeline before each use and that where a defect or unsafe condition that may create a hazard to a worker is identified in a connecting linkage, personal fall arrest system, full-body harness or lifeline.

14.4 DEFINITIONS

Competent Person: A competent person is one who is capable of identifying existing and predictable fall hazards that are dangerous to employees, and authorized to stop work and take prompt corrective action to eliminate them.

Qualified Person: A qualified person is one who, by possession of a recognized degree, certificate, or professional standing or who, by extensive knowledge, training, and experience, has successfully demonstrated the knowledge, skills, and ability to solve or resolve problems relating to fall protection at work.

Anchor: A secure point of attachment for lifeline or lanyard.

Anchorage: A secure means of attachment to check if the personal fall arrest system is connected.

Attachment Point: A loop or "D" ring connected (integrally) to the body support that provides a means for attachment of other components of the fall protection system.

Body Harness: straps which may be secured about the worker in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

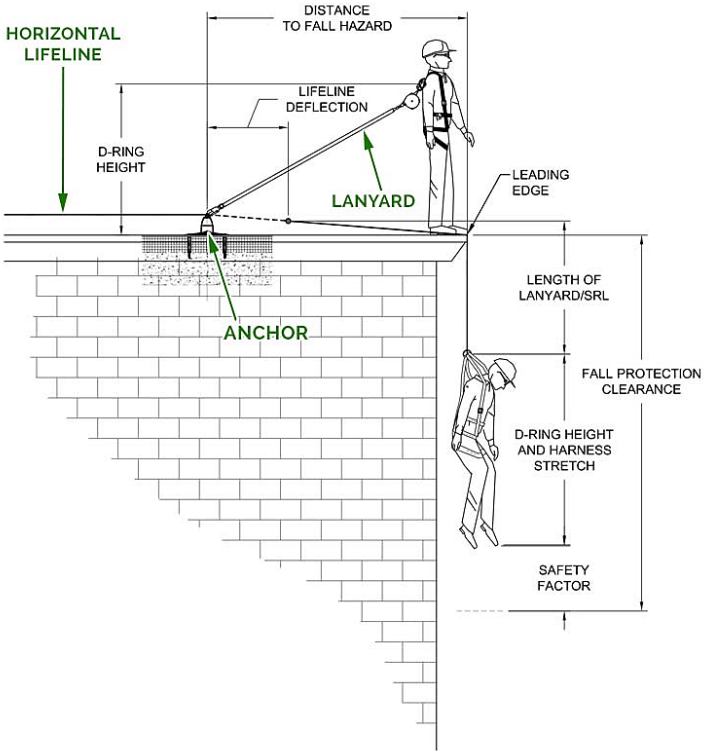
Carabiner: A link with a gate that is normally closed or that automatically closes, and is used to connect components of a personal fall protection system.

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

D Ring: A form of attachment point on body belts and fully body harnesses meant for attachment of other components of a fall protection and positioning system.

Fall Arrest System: A system that will stop a worker's fall before the worker hits the surface below.

Fall Prevention System: Those systems and techniques that eliminate the possibility of a fall.



Fall Protection System: Any of the following when used to protect a worker from a fall or minimize the risk from falling: Guardrails, Safety belt or a full body harness with a lanyard and/or lifeline and an anchor, and their related equipment, Safety net, Control zone, Safety monitor with a control zone, and other acceptable procedures.

Fall Restraint System: A work positioning system to prevent a worker from falling from a work position, or a travel restriction system such as guardrails or a personal fall protection system to prevent a worker from traveling to an edge from which the worker could fall.

Full Body Harness: A body support device consisting of connected straps designed to distribute a fall arresting force over at least the thigh, shoulders and pelvis, with provision for attaching a lanyard, lifeline or other components.

Horizontal Lifeline System: A system composed of a synthetic or wire rope installed horizontally between two anchors, to which a worker attaches a personal fall protection system.

Lanyard: A flexible line of webbing, synthetic rope or wire rope that is used to secure a safety belt or full body harness to a lifeline or anchor.

Lifeline: A synthetic or wire rope, rigged from one or more anchors, to which a worker's lanyard or other part of a personal fall protection system is attached.

Personal Fall Arrest System: A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

Rope Grab: A deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking or both (also referred to as a fall arrester).

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

Shock Absorber: A device intended to limit the deceleration forces exerted on a worker during fall arrest.

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

14.5 TRAINING

Workers are provided fall protection training. Workers who may be required to use fall protection must be provided training. Training must be provided by a competent person. Training should include the following:

The training must include the following:

- a review of current Alberta or BC legislation pertaining to fall protection
- an understanding of what a fall protection plan is
- fall protection methods a worker is required to use at a work site
- identification of fall hazards
- assessment and selection of specific anchors that the worker may use
- instructions for the correct use of connecting hardware
- information about the effect of a fall on the human body, including
    - maximum arresting force
    - the purpose of shock and energy absorbers
    - swing fall
    - free fall
- preuse inspection
    - emergency response procedures to be used at the work site, if necessary

- practice in inspecting, fitting, adjusting and connecting fall protection systems and components
- emergency response procedures.

Tower Crane Operators: Rescue Training

Time is of the essence when attempting to rescue an injured or ill tower crane operator. A rescue will involve training and a solid working knowledge of how to use the specific equipment. Ontario has several independent training providers you can hire to train your workers.

14.6 SAFE WORK PROCEDURES

Customer or Prime Contractor's fall protection requirements may be more stringent than legislated

The standard height at which fall protection is required is 10 ft. (3 m). or where a fall from a height of less than 3 m involves a risk of injury greater than the risk of injury from the impact on a flat surface or into or onto a hazardous substance or object, or through an opening in a work surface..

Some clients follow the more stringent US OSHA standard. In the Construction Industry, where workers must use fall protection on a walking or working surface with an unprotected side/edge which is 6 ft. (1.8 m) or more above a lower level (OSHA 1926.501b). In General Industry, fall protection for wall openings and holes must be used at a height of 4 ft. (1.2 m) (OSHA 1910.23b). Workers must adhere to client fall protection requirements if they exceed the legislated standard. If a guardrail system is not available, a fall arrest or travel restraint system must be used.

14.6.1 FALL PROTECTION PLAN

Control Tech must have a written fall protection plan and the fall protection plan must be available at the workplace before work with a risk of falling begins for a workplace if:

- work is being done at a location where workers are not protected by permanent guardrails, and from which a fall of 7.5 m (25 ft) or more may occur, or
- from which a fall of 3 m (10 ft) or more may occur, or
- where a fall from a height of less than 3 m involves a risk of injury greater than the risk of injury from the impact on a flat surface

14.6.2 GUARDRAILS

Guardrails are used for fall protection whenever practicable. Engineering controls such as guardrails are the best method of fall protection, and must be used whenever practicable. A standard guardrail consists of a top rail located between 92 cm (36 in) and 107 cm (42 in) above the work surface, and a mid-rail that is spaced midway between the top rail and the work surface. A guardrail must be capable of supporting a worker who may fall against it.

Engineering controls shall always be used first to remove the hazard of injuries by falls. Examples include:

- Designing engineered access walkways vs. use of elevating platforms, scaffolds or climbing.
- Stairway units on scaffolds versus climbing a scaffolding ladder.

Use of guard rails, safety net or personal fall arrest systems shall be used when the standard methods of protection are not feasible or a greater hazard would be created.

An opening into which a worker may fall, other than a hatchway, chute, pit or trap-door opening shall be guarded on all exposed sides by guardrails or by an adequately strong and supported cover secured over the opening.

Where a guardrail is removed in order for work to be done Control Tech and any contractor shall each ensure that adequate precautions are taken to ensure the safety of the worker doing the work and any other worker, and the area is not left unguarded. A worker who removes a guardrail in order to do work shall replace the guardrail before leaving the area.

14.6.3 FALL PROTECTION EQUIPMENT

The use of travel restraints or fall arrest equipment is used when guardrails cannot provide sufficient protection.

A personal fall arrest system is arranged so that a worker cannot hit the ground, an object which poses an unusual possibility of injury, or a level below the work area.

A travel restraint system prevents a worker from falling off an unguarded edge of an elevated work surface. It typically consists of:

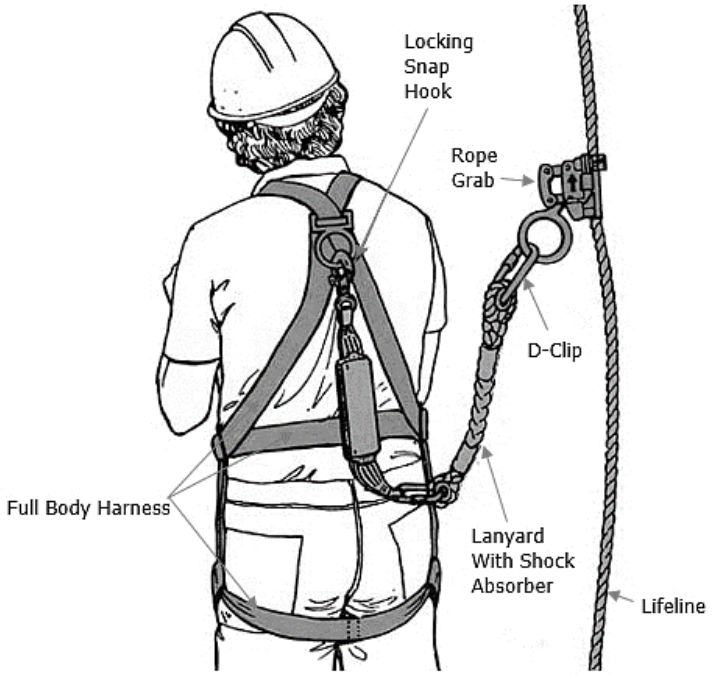
- a belt or harness the worker wears
- a lanyard that clips on to it
- and an anchor point

A fall arrest system stops a fall from an elevated work area. It consists of:

- an anchor point
- connectors
- a body harness
- and may include a lanyard, deceleration device, or lifeline

A properly designed fall arrest system will prevent a falling worker from striking an object or the surface below. A travel restraint or fall arrest system must be used when a worker is exposed to a potential fall when guardrails are not practicable.

Fall Protection Equipment Components



Equipment used for a fall protection system must consist of compatible and suitable components, be sufficient to support the fall restraint or arrest forces and meet, and be used in accordance with, an applicable CSA or ANSI standard in effect when the equipment was manufactured.

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

A worker using a personal fall arrest system must wear and use a full body harness.

A worker uses a body belt only as part of a travel restraint system.

A lanyard used by a worker is made of wire rope or other material appropriate to the hazard if a tool or corrosive agent that could sever, abrade, or burn a lanyard is used in the work area.

A personal fall arrest system consists of a full body harness and a lanyard equipped with a shock absorber or similar device. Control Tech must ensure that a carabiner or snap hook:

- is self-closing and self-]locking
- may only be opened by at least two consecutive deliberate manual actions
- is marked with its breaking strength in the major axis, and the name or trademark of the manufacturer

All components of a fall protection system are compatible with one another and with the environment in which they are used. Where a snap hook is used as an integral component of a personal fall arrest system, connecting linkage, fall arresting device, full body harness or lifeline Control Tech shall ensure that the snap hook is self-locking and is approved and maintained.

A worker **must wear a full body harness** when using a personal fall protection system for fall arrest.

A worker **must wear a safety belt or a full body harness** when using a personal fall protection system for fall restraint.

A fall arrest system shall consist of a full body harness with adequate attachment points and a lanyard equipped with a shock absorber or similar device.

The fall arrest system shall be attached by a lifeline or by the lanyard to an independent fixed support.

A lanyard must be kept as short as work conditions permit, and be constructed of nylon, polyester or polypropylene rope or webbing or wire rope that is equipped with an approved shock absorbing device and be equipped with suitable snap hooks and is approved and maintained.

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Where vertical lifelines are used, each worker shall be attached to a separate lifeline.

Where the use of a lifeline is required Control Tech shall ensure that the lifeline is suitable for the conditions in which the lifeline is to be used, having regard to factors including strength, abrasion resistance, extensibility and chemical stability. Control Tech will ensure that a lifeline is made of wire rope or synthetic material, is free of imperfections, knots and splices, other than end terminations, is protected by padding where the lifeline passes over sharp edges, is protected from heat, flame or abrasive or corrosive materials during use and is maintained to manufacturer's recommendations.

The attachment point of the body harness shall be located in the center of the wearer’s back near shoulder level, or above the wearer’s head, except when climbing.

Full body harnesses requirements:

- Full body harness and connecting linkage must be approved and maintained.
- Properly fitted to the worker.
- Worker is trained in the safe use of the full body harness.
- A permanent anchor for a personal fall protection system must have an ultimate load capacity in any direction required to resist a fall of at least 22 kN (5 000 lbs.).
- A protective thimble is used to protect ropes or straps from chafing whenever a rope or strap is connected to an eye or a D-ring used in the full body harness or connecting linkage.

Provide for prompt rescue of workers in the event of a fall or assure that workers are able to rescue themselves.

Personal fall arrest systems shall not be attached to guardrail systems nor shall they be attached to hoists unless prior approval is obtained from a competent person.

If and when a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the worker only as far as the edge of the walking/working surface.

British Columbia Requirements

In a temporary fall restraint system, an anchor for a personal fall protection system must have an ultimate load capacity in any direction in which a load may be applied of at least

- 3.5 kN (800 lbs), or
- four times the weight of the worker to be connected to the system.

Each personal fall protection system that is connected to an anchor must be secured to an independent attachment point.

In a temporary fall arrest system, an anchor for a personal fall protection system must have an ultimate load capacity in any direction required to resist a fall of at least

- 22 kN (5 000 lbs), or
- two times the maximum arrest force

A permanent anchor for a personal fall protection system must have an ultimate load capacity in any direction required to resist a fall of at least 22 kN (5 000 lbs).

A temporary horizontal lifeline system may be used if the system is

- manufactured for commercial distribution and installed and used in accordance with the written instructions from the manufacturer or authorized agent, and the instructions are readily available in the workplace,
- installed and used in accordance with written instructions certified by a professional engineer, and the instructions are readily available in the workplace, or
- designed, installed and used in a manner acceptable to the Board

The following types of equipment and systems, and their installation, must be certified by a professional engineer:

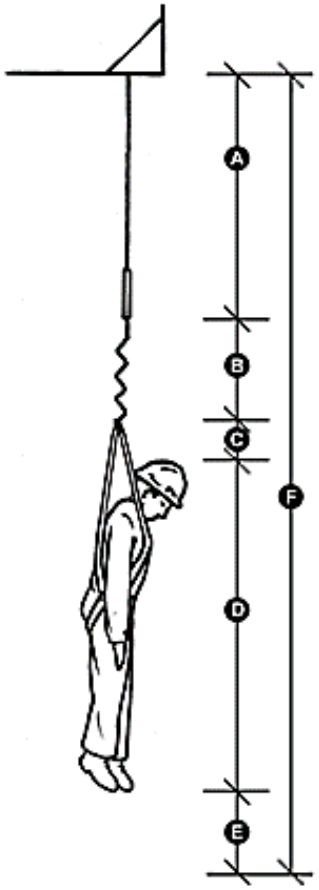
- permanent anchors
- anchors with multiple attachment points
- permanent horizontal lifeline systems
- support structures for safety nets

14.6.4 FALL PROTECTION CALCULATIONS

The fall arrest system is of no help if you reach the ground before your fall is stopped. Calculate the required fall arrest distance (measured from a rigid anchorage point) by following the steps below.

To ensure the safety of a fallen worker, **two conditions must be met**.

1. the worker's personal fall arrest system is arranged so that the worker cannot hit the ground, an object which poses an unusual possibility of injury, or a level below the work area
2. there must be sufficient clearance distance including a safety factor



A Length of lanyard
B Shock absorber pulling apart
C Harness stretch plus D-ring sliding
D Height of worker
E Safety factor
F Minimum clearance distance

$$A + B + C + D + E = F$$

This information is from: Alberta Labour, OHS Code Explanation Guide: Part 9 Fall Protection

14.6.5 INSPECTIONS / DEFECTS / UNSAFE CONDITIONS

Equipment, used as part of a fall protection system is inspected by the worker as required by the manufacturer before it is used on each work shift, kept free from substances and conditions that could contribute to deterioration of the equipment, and re-certified as specified by the manufacturer.

Workers must complete a visual inspection of their fall protection equipment before each use. The inspection shall include:

- Hardware (inspect hardware, including snap hooks, D-rings, and buckles for damage, and check for sharp edges, corrosion, burrs, cracks, and worn parts)
- Webbing (check for tears, abrasions, mold, burns, heavy soiling, or discoloration, and chemical or heat damage
- Cable (inspect for cuts, kinks, broken wires and fibers, corrosion, chemical contact, and severely abraded areas)
- Labels (affixed and fully legible).

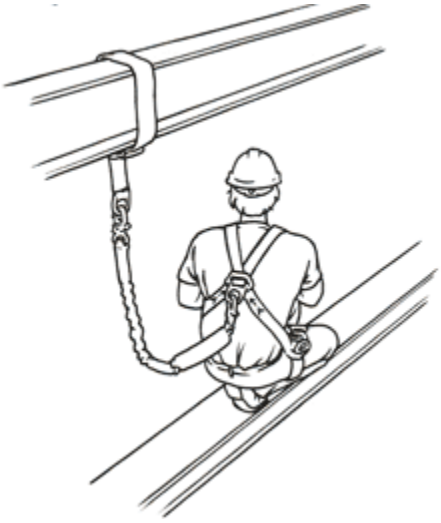
After a fall protection system has arrested the fall of a worker, it must be removed from service, and not be returned to service until it has been inspected and recertified as safe for use by the manufacturer or its authorized agent, or by a professional engineer.

Defective fall protection equipment must be removed from service and either returned to the manufacturer or destroyed. Fall protection equipment that is found to be defective must be taken out of service.

An out-of-service tag should be affixed to the equipment indicating it is defective.

Defective fall protection equipment is **removed from service** if it has come into **contact with excessive heat, a chemical or any other substance that may corrode** or otherwise damage the fall protection system.

Fall protection equipment shall not be knotted or allowed to become knotted. Safety belts, harnesses, lanyards and lifelines shall not be knotted or allowed to become knotted.



<u>BC Inspection and maintenance</u>

Equipment used in a fall protection system must be

- inspected by a qualified person before use on each workshift
- kept free from substances and conditions that could contribute to its deterioration
- maintained in good working order

14.6.6 PROTECTION FROM FALLING OBJECTS

When workers are required to work in the near vicinity of others working with materials, tools, or equipment at elevated levels, Barricades around the immediate area of the overhead work shall be erected to prohibit workers from entering the barricaded area.

Employees performing work at elevated levels shall keep tools, materials, and equipment away from the edge to keep potential objects from falling over the side. Where practical, tools, etc. should be secured with rope, wire, etc. to keep them from falling.

<u>Portable Ladders</u>

Three point climbing is required while ascending/descending ladders. While on ladders, both hands and one foot, or both feet and one hand shall always be in contact with the ladder.

Tools required to perform a task shall be transported by a mechanical carrier such as a tag line, suspended bucket or tool belt. Additionally:

- Tools shall not be carried by hand while climbing.
- Hands must be free to grip the ladder.
- Tools shall not be carried in clothing pockets.
- Tools shall be pulled up to the job site only after reaching the area of work.

Straight ladders shall be tied off at the top to prevent them from moving. A second person shall steady the ladder at the base while it is being tied off at the top by another worker. Do not tie off fall protection equipment to the ladder.

14.6.7 STORAGE

Fall protection equipment must be kept free from substances and conditions that could contribute to its deterioration and maintained in good working order.

A dedicated storage area shall be provided for the storage of fall protection equipment and all components. The storage area shall keep the equipment clean, dry, and free from oils, chemicals, paints and excessive heat.

14.6.8 ELEVATED PERSONNEL PLATFORMS

Work performed, regardless of the nature of the work, from personnel platforms raised by forklifts, cranes, scissor lifts, a boom elevating work platform, boom-supported aerial device, or telescopic forklift truck work platform requires a personal fall arrest system and the worker shall be connected to the platform.

14.7 EMERGENCY PLANNING

A fall arrest rescue plan must be developed before workers may use a fall arrest system at a work site. Written rescue procedures must be established and in place before any worker uses a fall arrest system at a work site. The plan must include method(s) to be used to rescue a suspended worker from a fall arrest system following a fall. If external emergency services are to be used, ensure they are capable of performing that method of rescue, and that they are readily available to assist.

The implementation and maintenance of a safe work environment is the collective responsibility of all employees, contractors, and visitors to the jobsite. Workers may have to perform a working at heights rescue to bring down a worker who has fallen and is suspended in a safety harness.

It is our company policy to provide prompt medical treatment when a worker is injured on the jobsite.

The pre-planning stage prior to the beginning of each elevated work assignment shall be evaluated by the manager or Safety Manager to provide rescue of workers involved in a fall.

<u>If a worker falls and is suspended by a safety harness, implement the emergency response plan by following the steps below.</u>

1. The site supervisor (or alternate foreperson) takes control of the situation.
2. The site supervisor sounds the emergency alarm—two long blasts from a horn. All workers in the immediate vicinity of the incident stop working. The site supervisor quickly evaluates the situation and identifies any further hazards that could arise.
3. The site supervisor or their designate goes to get help if workers are close by. If no one is close enough, the site supervisor calls for help.
4. The site supervisor calls 911 to notify local police, fire, and ambulance if required.
5. The crane operator remains on standby. The operator frees the hook and waits for further direction in case the designated rescue team must perform a basket rescue.
6. The site supervisor (or a worker assigned to the task) isolates the accident zone and its perimeter to limit further exposure.
7. The site supervisor (or a worker assigned to the task) moves all non-affected personnel to a safe zone or directs them to remain where they are.
8. The site supervisor enables radio silence on the jobsite, except for crisis communications from emergency responders. These communications are conducted on a pre-selected "emergency only" radio channel.

9. The site supervisor sends a designated worker to the site gate to meet the response team (police, medical, fire, etc.) and ensure that they have a safe access path to the accident scene.
10. The site supervisor assembles the emergency rescue team at the accident site as quickly as possible to determine the best rescue procedure for the situation.

14.8 RESCUE PROCEDURES

14.8.1 A - ELEVATING WORK PLATFORM RESCUE

If an elevating work platform (EWP) is available on site and the suspended worker can be reached by the platform, follow the procedure below.

1. Bring the EWP to the accident site and use it to reach the suspended worker.
2. Ensure that rescue workers are wearing full-body harnesses attached to appropriate anchors in the EWP.
3. Ensure that the EWP has the load capacity for both the rescuer(s) and the fallen worker. If the fallen worker is not conscious, two rescuers will probably be needed to safely handle the weight of the fallen worker.
4. Position the EWP platform below the worker and disconnect the worker's lanyard when it is safe to do so. When the worker is safely on the EWP, reattach the lanyard to an appropriate anchor point on the EWP if possible.
5. Lower the worker to a safe location and administer first aid. Treat the worker for suspension trauma and any other injury.
6. Arrange transportation to hospital if required.

14.8.2 B - LADDER RESCUE

If an elevating work platform is not available, use ladders to rescue the fallen worker with the procedure outlined below.

1. If the fallen worker is suspended from a lifeline, move the worker (if possible) to an area that rescuers can access safely with a ladder.
2. Set up the appropriate ladder(s) to reach the fallen worker.
3. Rig separate lifelines for rescuers to use while carrying out the rescue from the ladder(s).
4. If the fallen worker is not conscious or cannot reliably help with the rescue, at least two rescuers may be needed.
5. If the fallen worker is suspended directly from a lanyard or a lifeline, securely attach a separate lowering line to the harness.
6. Other rescuers on the ground (or closest work surface) should lower the fallen worker while the rescuer on the ladder guides the fallen worker to the ground (or work surface).
7. Once the fallen worker has been brought to a safe location, administer first aid and treat the person for suspension trauma and any other injury.
8. Arrange transportation to hospital if required.

14.8.3 C - RESCUE FROM WORK AREA OR FLOOR BELOW

If the fallen worker is suspended near a work area and can be safely reached from the floor below or the area from which they fell, use the following procedure.

1. Ensure that rescuers are protected against falling.
2. If possible, securely attach a second line to the fallen worker's harness to help rescuers pull the fallen worker to a safe area. You will need at least two strong workers to pull someone up to the level from which they fell.

3. Take up any slack in the retrieving line to avoid slippage.
4. Once the worker has been brought to a safe location, administer first aid and treat the person for suspension trauma and any other injury.
5. Arrange transportation to hospital if required.

14.8.4 BASKET RESCUE

If a worker has fallen and is suspended in an inaccessible area, you may need to perform a basket rescue.

For basket rescues, the basket must be designed by a professional engineer in accordance with good manufacturing processes to withstand all loads to which it may be subjected. It must be kept on site at all times in an accessible location where it is clear of material or other equipment. Fit the rescue basket with appropriate rigging for quick hookup by the crane operator.

Always keep the following items in the rescue basket.

1. First-aid kit
2. Three lanyards equipped with shock absorbers
3. One full-body harness
4. Tag line attached to the basket at all times
5. Descent controller rescue device in good working condition
6. Secondary safety line to tie the basket above the headache ball of the crane.

To perform a basket rescue, follow the steps below.

1. Make sure preferred methods A, B, and C are not possible.
2. Notify the crane operator right away to position the crane to attach the basket.
3. While the basket is being attached, the crew leader checks that all safety rigging is done and all the required safety equipment is available.
4. With two rescuers in the basket, hoist it to a position that is above and as close as possible to the fallen worker. A designated worker on the ground guides the basket with a tag line. The designated worker must make sure that when the rescue basket reaches the right elevation, the door of the basket is facing the structural steel to provide an easy exit for rescuer #1.
5. Rescuer #1 exits the rescue basket and gets into a position to reach the fallen worker. When doing this, rescuer #1 must be tied-off at all times to either the structure or the rescue basket.
6. Rescuer #2, who is still in the rescue basket, lowers the line that will be used to retrieve the worker. Rescuer #2 attaches an extra lanyard to the line if required.
7. Rescuer #1 assesses the fallen worker for injuries and then decides how to proceed (i.e., treat injuries first, guide the fallen worker into the rescue basket, or lower the basket to the ground with the fallen worker attached to it).
8. Once the fallen worker has been brought to a safe location, administer first aid. Treat the person for suspension trauma and any other injury.
9. Arrange transportation to hospital. A designated worker must accompany the injured worker to hospital.

If the basket rescue is the method used, keep the following points in mind.

- Perform a basket rescue only when it is not possible to use conventional equipment to rescue the fallen worker in a safe manner.
- Never exceed the maximum number of workers in the basket as indicated on the nameplate.
- Ensure that a competent worker inspects the crane and equipment being used prior to lifting rescuers.
- Always equip the crane with a fail-safe mechanism to prevent the boom from descending in the event of a power source or system failure.
- Maintain an adequate means of communication between the rescuers in the basket and the crane operator at all times.

- Ensure that workers in the rescue basket wear full-body safety harnesses attached to a lanyard and anchored to appropriate points in the basket at all times.
- Make sure that all rigging used to attach the rescue basket to the hook of a load line has a safety factor of 10 against failure. There should be a safety line attached to the load line directly from the basket.
- Do not allow cranes to travel while rescuers are in the basket.
- Do not use suspended rescue baskets during high winds, electrical storms, snow, ice, sleet, or other adverse conditions that could affect the safety of personnel on the platform or in the basket.

14.8.5 POST-RESCUE PROCEDURE

All non-affected workers should remain in the designated safe gathering zone until the site supervisor notifies them to do otherwise.

The site supervisor and health and safety representative should

- Begin the accident investigation.
- Quarantine all fall-arrest equipment that may have been subjected to fall fatigue effects and/or shock loading for further investigation.
- Secure the area (the OHSA requires that an accident scene not be disturbed where a fatal or critical injury has occurred).
- Determine whether or not the jobsite-specific rescue and evacuation plans were followed as designed.
- Record modifications or additions to the plans that the rescue team deems necessary.
- Record all documented communications with fire, police, MOL, and other contractors involved. (When a fall occurs and is arrested, you must notify the MOL in writing.)
- Record all documented statements from employees, witnesses, and others.
- Save all photographs of the incident.
- Record all key information such as dates, time, weather, general site conditions, and specific accident locales including sketches of the immediate incident area, complete with measurements if applicable.

15.0 FATIGUE MANAGEMENT

15.1 PURPOSE

The purpose of a Fatigue Management Program (FMP) is to ensure management, supervisory personnel and employees understand what factors contribute to fatigue, how extended hours of work and consecutive days of work can affect fatigue and the benefits of dealing with worker fatigue through a FMP.

The overall objective of fatigue management is to reduce the number of fatigue-related incidents and collisions and improve safety of all road users.

This FMP will include ways to measure, manage and respond to fatigue of workers in the industry.

- To address fatigue training for new and existing employees
- To identify and manage fatigue risks and hazards in the workplace
- To properly keep employee records (i.e. hours of work, training, incidents, etc.)
- To accurately report fatigue related issues and incidents
- To effectively evaluate and measure the success of the company's FMP

15.2 SCOPE

This fatigue management program is to be followed by all employees.

15.3 RESPONSIBILITIES

Management

- Ensure the FMP is implemented throughout the company
- Provide the necessary information about fatigue
- Provide instruction and training
- Ensure employers are properly recording hours of work
- Communicate employer expectations
- Monitor the effects of extended work hours and extended consecutive days of work
- Support employees who are experiencing concerns with fatigue
- Assist and advise line supervisors
- Record times at which employees start and stop work each day
- Investigate any problems or concerns
- Regularly inspect the workplace and review FMP with employees
- Review the company's FMP

Supervisors

- Ensure all workers understand the FMP
- Conduct safety meetings discussing fatigue and the FMP
- Promote the FMP
- Ensure tasks are performed in safe and healthy manner
- Be aware of the possible risks associated with extended hours and consecutive days of work
- Give workers as much notice as possible if extended hours are anticipated
- Observe and record how individuals respond to extended work periods
- Recognize symptoms of fatigue
- Get feedback from individual workers
- Take prompt action if a risk develops
- Relay information to and from management and employees
- Report any FMP problems, concerns or issues

Workers

- Actively participate in FMP training
- Recognize symptoms of fatigue
- Tell supervisor if fatigue may impact your performance
- Promptly report any fatigue related concerns
- Report any individual medical or personal situations, which may influence fatigue
- Make smart lifestyle choices - sleep hygiene, nutrition, fitness, etc.
- Identify personal stress and seek assistance if required
- Be aware and ask question about sleep disorders

15.4 FATIGUE MANAGEMENT POLICIES AND GUIDELINES

Fatigue causes slower reaction times and can result in poor decisions, more mistakes, decreased performance, and dangerous memory lapses. This program is intended to help increase employee awareness of fatigue and manage the associated risk factors to prevent or reduce fatigue related loss including injury, illness, productivity interruption, environmental or reputation.

The guiding principles of fatigue management shall be incorporated into the normal management functions of the business and include the following:

- Workers must be in a fit state to undertake work
- Workers must be fit to complete work
- Workers must take minimum periods of rest to safely perform their work

These principles will be managed through:

- The appropriate planning of work tasks, including driving, vehicle and equipment maintenance, loading and unloading and other job related duties and processes
- Providing appropriate equipment to help reduce stress and fatigue
- Regular medical checkups and monitoring of health issues as required by legislation
- The provision of appropriate sleeping accommodations where required
- Ongoing training and awareness of employee health and fatigue issues

15.5 TRAINING AND EDUCATION

Workers are provided training on the Fatigue Management program. All Company employees are required to attend FMP training. Training will be provided on how to recognize fatigue, how to control fatigue through appropriate work and personal habits, and fatigue reporting. Training will consist of some or all the following aspects, dependent upon the employee's position and responsibilities.

- Determine what fatigue is
- The impacts and causes of fatigue
- Signs and symptoms of fatigue
- Preventive methods for dealing with fatigue
- Benefits of a FMP
- Reporting procedures
- Monitoring methods
- Program review processes

Records of individual training and competency will be maintained.

Fatigue management is covered in the new employee orientation. Re-training will be completed if program changes or reviews of incidents and inspections indicate a need.

15.6 FACTORS OF FATIGUE

Fatigue is a complex issue that can result from increased hours of work, work-related stress, time spent driving, night shift driving, and other activities of the workplace. Fatigue can also be caused by issues outside of the workplace, including personal and environmental factors.

Work-Related Factors

- Long work hours and periods of being awake
- Working at night
- Continuous mental/physical effort
- Lack of enforcing hours of service regulations
- Work-related stress
- Lack of training, education, and regular medical testing

Personal Factors

- Mental exhaustion
- Social problems
- Poor diet
- Lack of exercise
- Economic problems
- Medical issues related to fatigue
- Illness
- Drug Use
- Psychological and mental conditions
- Family/relationship issues
- Poor sleep quality

Environmental Factors

- Heat, noise, vibrations
- Lack of nutritious food/drink
- Stress due to traffic congestion or extended periods of waiting

15.7 IMPACTS OF FATIGUE

Organizations impacted by fatigue may expect reduced productivity, increased rates of employee absenteeism and grievances, and increased legal and insurance costs due to a greater number of fatigue-related incidents.

Behavioral Impacts

- Loss of attention
- Impaired decision-making
- Impaired reasoning
- Slower reaction time
- Poor awareness of high risk situations
- Poor understanding of consequences of actions
- Difficult to manage multiple sources of information
- Easily distracted
- Lack of social interaction
- Declining attitude and mood
- Decreased morale
- Laziness and forgetfulness

- Performance declines

Business Impacts

- Increased number and severity of incidents
- Increased employee absenteeism
- Decreased productivity
- Decreased employee morale
- Challenge to retain employees
- Frequent employee turnover
- Inability to attract new talent
- Knowledge and experience gaps
- Increased employee grievances
- Increased liability and legal costs
- Increased Worker's Compensation Board (WCB) premium insurance costs
- Loss of business reputation

Societal Impacts

- Increased collisions and fatalities
- Increased risk to the motoring public
- Decreased road safety
- Increased public health costs
- Increased social costs
- Increased need for social programs
- Decreased productivity

15.8 JOB ASSESSMENT

An assessment is completed on all jobs. If fatigue is seen as a hazard for the job controls will be put in place to minimize or eliminate the hazards. Control Tech will consider the following when evaluating the need for managing fatigue:

- Is there a commute to the worksite that may contribute to an extended work day?
- Are workers required to work irregular hours, shift work or be “on-call”?
- Are the worker’s tasks mentally engaging?
- Are workers active or sedentary for their tasks?
- What could the outcomes of a fatigue related incident really be for workers in each role, property damage, lost production, clerical error, catastrophic or something worse?
- Do the physical work conditions require heavy activity or work in extreme conditions?
- Have there been unexplained losses or incidents where no cause could be identified but fatigue could not be ruled out?
- Is there a requirement for a critical response to an alarm or alert?
- Does the sequence of tasks or work flow induce fatigue related errors?

15.9 PROCEDURES FOR MANAGING FATIGUE AND RISK

Job tasks are designed to minimize/control fatigue as much as is practicable.

Work tasks to control fatigue must be analyzed and evaluated periodically.

Fatigue hazards should be minimized. Examples of fatigue hazards include the type of work task, the length of the task, workplace conditions, etc. This will be included in the site specific hazard analysis.

Work schedules are managed to help control worker fatigue.

Control Tech will set work hour limitations and will control job rotation schedules to control fatigue, allow for sufficient sleep, and increase mental fitness.

Work scheduling should take into consideration the amount of rest between workdays, shift work, on-call time, traveling across different time zones, etc.

Workers should take periodic breaks to minimize fatigue and increase mental fitness.

Control Tech provides sufficient rest breaks for workers to allow for rest and recovery time. Depending on the location, this may also include access to proper nutrition and opportunities for physical activity.

NSC Hours of Service regulations will be followed by all commercial drivers. No driver shall drive and no dispatcher shall request a driver to drive who does not have enough hours left in the day/cycle to complete the trip unless daily destination and rests are scheduled in.

Workers must never operate motor vehicles and/or heavy equipment while excessively fatigued.

Ergonomic equipment will be used to improve workstation conditions such as anti-fatigue mats for standing, lift assist devices for repetitive lifting, proper lighting and controls of temperature and other ergonomic devices as deemed appropriate. Equipment to be used will be determined in the work task analysis.

15.10 REPORTING & INVESTIGATION REQUIREMENTS

Reporting Safety Issues Related To Fatigue

1. Safety issues related to fatigue must be reported to the supervisor immediately. These are immediately investigated by supervisor.
2. All reports are documented and corrective actions taken.

Reporting Fatigue

1. Workers must report fatigue to their supervisor.
2. Supervision must take appropriate actions to prevent loss

Investigating Fatigue Incidents and the Impact of Fatigue in Operations

1. All incidents must be reported.
2. Management will investigate all incidents and take immediate and long term actions to reduce or eliminate the root causes that contributed to the incident.
3. All investigations will be documented and reviewed by management

If there is an incident there shall be an initial identification/assessment of evidence. Initial identification of evidence immediately following the incident might include a listing of people, equipment, materials involved and a recording of environmental factors such as weather, illumination, temperature, noise, ventilation, etc. and physical factors such as fatigue, age and medical condition.

15.11 RECORDKEEPING PRACTICES

- Employee/Driver Time Records
- Program Policies and Procedures
- Training/Orientation Completion
- Incident Reporting and investigations
- Remedial Action Taken Related To Incidents

15.12 MONITORING AND REVIEW TO EVALUATE EFFECTIVENESS

The method used to evaluate program success must be recognized and measured prior to carrying out the program, and periodically measured again once the program is in motion.

The overall objective of fatigue management is to reduce the number of fatigue-related incidents and collisions and improve safety of all road users.

The carrier can track the number of fatigue incidents, collisions, and hours of service violations prior to and following program implementation.

Evaluation methods may also include tracking and comparing employee absenteeism rates and sick days, employee grievances, employee turnover, and program feedback.

Fatigue Management Program Measurements include:

- Number of fatigue-related incidents and collisions
- Number of hours of service violations
- Employee absenteeism rates and sick days
- Employee feedback on program
- Employee turnover rate
- Number of employee grievances

Program Monitoring

Management/ supervisors will:

- monitor crew's hours of work
- determine the need for extended hours
- determine the need for extended consecutive days of work
- monitor crews when working extended hours and extended consecutive days for fatigue related concerns
- address crew member concerns regarding working extended hours
- monitor supervisor/ employee relationships
- ensure everyone has been properly trained in the FMP

Program Review

- Periodically review FMP policy and procedures
- Compare ratio of crew working extended hours to those not working extended hours
- Determine and review the causes and impacts for working extended hours and consecutive days
- Review the effectiveness of the FMP
- Employee feedback on the FMP
- Investigate the number of fatigue-related incidents
- Review all factors affecting the need for extended hours and extended consecutive days of work
- Discuss possible alternatives to extended hours of work

16.0 FIRE PROTECTION

16.1 PURPOSE

The purpose of this program is to provide fire safety planning regarding fire, explosion, combustible materials and appropriate planning and procedures required to minimize risk for operations. The material in this document does not take precedence over applicable government legislation which all employees must follow.

16.2 SCOPE

This program applies to all Control Tech workers and all Control Tech locations. When work is performed on a site under the control of a prime contractor, the prime contractor program shall take precedence, however, this document covers Control Tech workers and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

16.3 RESPONSIBILITIES

Safety Manager

The safety manager is responsible for developing procedures for the design of fire safety plans and procedures at each Control Tech work site. The site manager is responsible for implementing the requirements and training at his location. The supervisors are responsible for enforcing the provisions of this section of the safety manual.

Worksite Project Manager

Responsible for the implementation and maintenance of the fire and explosion prevention program for their facility and ensuring all assets are made available for compliance with the procedure.

Employees

All workers are responsible for following these provisions and attending specified training.

16.4 DEFINITIONS

Carbon dioxide – A colorless, odorless, electrically nonconductive inert gas (chemical formula CO(2)) that is a medium for extinguishing fires by reducing the concentration of oxygen or fuel vapor in the air to the point where combustion is impossible.

Class A fire – A fire involving ordinary combustible materials such as paper, wood, cloth, and some rubber and plastic materials.

Class B fire – A fire involving flammable or combustible liquids, flammable gases, greases and similar materials, and some rubber and plastic materials.

Class C fire – A fire involving energized electrical equipment where safety to the employee requires the use of electrically nonconductive extinguishing media.

Class D fire – A fire involving combustible metals such as magnesium, titanium, zirconium, sodium, lithium and potassium.

Dry chemical – An extinguishing agent composed of very small particles of chemicals such as, but not limited to, sodium bicarbonate, potassium bicarbonate, urea-based potassium bicarbonate, potassium chloride, or monoammonium phosphate supplemented by special treatment to provide resistance to packing and moisture absorption (caking) as well as to provide proper flow capabilities. Dry chemical does not include dry powders.

Dry powder – A compound used to extinguish or control Class D fires.

Extinguisher classification – The letter classification given an extinguisher to designate the class or classes of fire on which an extinguisher will be effective.

Extinguisher rating – The numerical rating given to an extinguisher which indicates the extinguishing potential of the unit based on standardized tests developed by Underwriters' Laboratories, Inc.

Incipient stage fire – A fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus.

16.5 ASSESSMENT FOR FIRE AND EXPLOSION HAZARDS

A site specific assessment for fire protection shall be developed for each project. The Control Tech Safety Manager will perform a written assessment review.

16.6 FIRE SAFETY PLAN

Control Tech will factor the following into the hazard assessment and development of the site specific fire safety plan and shall:

1. Take all reasonably practicable steps to prevent the outbreak of fire and to provide effective means to protect workers from any fire that may occur
2. Develop and implement a written fire safety plan that provides for the safety of all workers in the event of a fire. A plan developed must include:

15. the emergency procedures to be used in case of fire, including - sounding the fire alarm, notifying the fire department and evacuating endangered workers, with special provisions for workers with disabilities;
16. the quantities, locations and storage methods of all flammable substances present at the place of employment;
17. the designation of persons to carry out the fire safety plan and the duties of the designated persons;
18. the training of designated persons and workers in their responsibilities for fire safety; the control of fire hazards

3. Suitable procedures are developed and implemented to prevent the ignition of flammable liquids or explosive dusts that are present at a worksite;
4. All sources or potential sources of ignition are eliminated or controlled where an explosive atmosphere exists or is likely to exist; and
5. Static charge accumulations during transfer of flammable liquids or explosive substances from one container to another are to be prevented by electrically bonding the containers or otherwise designed to control the presence of static electricity.
6. Flammable and combustible substances are stored separately from substances they might react with.

16.7 FIRE POTENTIAL AND RESPONSE PROCEDURES

All leaks of flammable liquids will be reported immediately and repaired if practicable. If immediate repair is not possible, all spark-producing operations within the vicinity of the leak or spill will be stopped and adequate warning signs or barricade tape will be posted until the hazard is controlled or eliminated.

If a worker's clothing is contaminated with a flammable or combustible liquid, the worker must avoid any activity where a spark or open flame may be created or exists, remove the clothing at the earliest possible time and ensure that the clothing is decontaminated before it is used again. If a worker's skin is contaminated with a flammable or combustible liquid, the worker must wash the skin at the earliest possible time.

All fires at a Control Tech worksite shall be reported to supervisory personnel immediately. A written incident report will be filed by the immediate supervisor in charge of that area once the fire has been addressed.

16.8 FIRE EXTINGUISHING

16.8.1 FIRE EXTINGUISHING THEORY

Fire is a chemical reaction that occurs when a fuel rapidly unites with oxygen in the presence of a heat source, and a flame is produced. Four elements are necessary to produce and support a fire:

- Fuel source (solid - liquid - gas)
- Heat source (a type of energy)
- Oxygen source (gas for ignition and flame support)
- Chemical chain reaction (occurs when fuel, heat and oxygen are united in the proper proportions to create a fire).

If any one of these four elements is eliminated, the fire will go out. There are four ways that a fire can be extinguished:

- Isolate, contain, separate, cover, or remove the fuel source.
- Remove the heat source by applying a cooling agent which absorbs the heat. Water is the most common cooling agent used to remove the heat from the reaction.
- Separate the oxygen from other essentials that make a fire by smothering the fire with a wet blanket, throwing soil or sand on it, or covering it with a chemical foam or water fog.
- Stop the chemical reaction by applying certain chemical substances that break up this chain reaction, such as sodium bicarbonate (baking soda) or potassium bicarbonate ("purple K") or sodium monophosphate (ABC dry chemical). Application of these chemicals will result in a reduction of the combustion rate and the fire can be extinguished.

16.9 FIRE EXTINGUISHERS

Fire extinguishing equipment is readily available. Each work site shall be provided with readily accessible fire extinguishers adequately marked locations at a project.

Every worker who may be required to use fire extinguishing equipment shall be trained in its use.

Control Tech will ensure that portable fire extinguishers are selected, located, inspected, maintained and tested so the health and safety of workers at the place of employment is protected.

Fire extinguishers that have been partially or completely used will be removed from service and replaced by similar equipment that has been inspected and authorized for service. Spent containers will temporarily be placed at either any work site trailer or each individual main office location.

Every fire extinguisher shall be inspected for defects or deterioration at least once a month by a competent worker who shall record the date of the inspection on the tag attached to it.

All portable fire extinguishers shall also be checked annually by a competent fire extinguisher supplier.

Portable fire extinguishers are to be selected, located, inspected, maintained and tested so that the health and safety of workers at the place of employment is protected. Control Tech shall ensure that portable fire extinguishers are placed not more than nine metres away from each industrial open-flame portable heating device, tar pot or asphalt kettle that is in use and each welding or cutting operation that is in progress.

<u>All fire extinguishers shall be maintained as follows:</u>

- Fully charged and in operable condition
- Clean and free of defects

- Readily accessible at all times

In the event of a fire, one trained worker will get the nearest fire extinguisher and use it to attempt to put the fire out. All other workers in the immediate area will prepare to evacuate if needed. All other workers in the building need to be advised that a fire is in progress.

The worker attempting to extinguish the fire will break the safety seal on the handle and pull the pin. He will then aim his extinguisher at the base of the fire and discharge it with a sweeping motion from side to side; continuing until the fire is out or the extinguisher is emptied.

Remember that a standard fire extinguisher will be emptied in about 10 to 15 seconds. If the fire is not out when the extinguisher has been completely discharged, the workers must evacuate the area.

16.10 FIRE CLASSIFICATIONS

There are 3 basic fire classification types present within Control Tech operations and most host-facility job-sites. A specific class of fire extinguishers may be required based on the type of situation. The classifications are:

CLASS “A”

Fires that involve paper, wood, cardboard, textiles, etc. Foam or water-based liquids are used to extinguish this type of fire.

CLASS “B”

Fires that involve flammable liquid such as gasoline, diesel, grease, oil, paint, solvents, etc., dry chemicals, carbon dioxide or water in a spray-fog form are used to extinguish this type of fire.

CLASS “C”

Fires involving electrical equipment. Dry chemical or carbon dioxide is used to extinguish this type of fire.

Warning: Never use water to extinguish this type of fire due to the potential for electrical shock hazards.

Incipient Stage – Portable Firefighting Procedure

If personnel discover a fire in its early incipient (small) stage, initiate the following procedure if on Control Tech locations: (if servicing a host-facility client, observes that client’s contractor requirements concerning fire prevention.)

- Remain calm
- Report the fire to appropriate supervisory personnel
- If personnel believe the fire can be controlled through the use of a fire extinguisher and personnel are properly trained in the use of a fire extinguisher, seek out and remove the closest fire extinguisher from its securing location in the area of occurrence and put out the fire.

16.11 MISCELLANEOUS

Garbage that may constitute a fire hazard is stored in covered receptacles. Where garbage may constitute a fire hazard is present Control Tech shall provide covered receptacles for the garbage that are suitable to the nature of the hazard.

A person must not enter or work at a work area if more than 20 percent of the lower explosive limit of a flammable or explosive substance is present in the atmosphere. Atmospheric testing results will be assessed before a worker is exposed.

Hydrocarbon resistant gloves will be worn to prevent skin absorption by the hands.

16.11.1 CONTROL MEASURES FOR INTERNAL COMBUSTION ENGINES IN HAZARDOUS LOCATIONS

Control Tech must ensure that an internal combustion engine in a hazardous location has a combustion air intake and exhaust discharge that are equipped with a positive air shut-off and/or flame arresting device or located outside the hazardous location. Control Tech must ensure that all the surfaces of an internal combustion engine that are exposed to the atmosphere in a hazardous location are at a temperature lower than the temperature that would ignite a flammable substance present in the hazardous location or shielded or blanketed in such a way as to prevent any flammable substance present in the hazardous location from contacting the surface.

Whenever possible, internal combustion engines should be located outside the hazardous location.

Internal combustion engines in a hazardous location should not be running if possible.

No worker shall undertake any servicing or maintenance of a vehicle while a flammable liquid or gas or an explosive substance is loaded into or unloaded from the vehicle or is present in the vehicle in any place other than the fuel tank.

Any driver who operates a vehicle that contains a flammable liquid or gas or an explosive substance shall ensure that the engine of the vehicle is shut off during the connection or disconnection of the lines for the loading or unloading of the flammable liquid, gas or explosive substance.

16.12 SAFE STORAGE AND HANDLING

16.12.1 FLAMMABLE LIQUIDS AND SUBSTANCES

Control Tech must ensure that flammable substances stored or used at the work area will not be in sufficient quantity to produce an explosive atmosphere if inadvertently released, are not stored within 30 metres of an underground shaft, are not stored 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, and are stored only in containers approved to CSA Standard B376-M1980 (R2008), Portable Containers for Gasoline and Other Petroleum Fuels (or current version).

Flammable liquids such as various fuels or solvents will be transported in appropriately marked safety cans with their contents identified. No glass container use will be allowed.

The use of gasoline as a cleaning agent on Control Tech property is strictly forbidden. Only low flash point liquids are permissible for use in cleaning parts and machinery. Also no worker shall use gasoline to start a fire or use gasoline or replenish a tank on a heating device with a flammable or combustible liquid while the device is in operation or is hot enough to ignite the liquid.

All materials combustible and flammable liquids contaminated by flammable liquids are placed in receptacles that meet the requirements of the National Fire Code of Canada 1990, including any Revisions and Errata published from time to time, respecting the storage of flammable and combustible liquids that. All shall be non-combustible and have close-fitting metal covers, are labelled “flammable” and are located at least one metre away from other flammable liquids.

Metallic or conductive containers used to transfer flammable liquids must be electrically bonded to each other or electrically grounded while their contents are being transferred from one container to the other.

Only containers approved to CSA Standard B376-M1980 (R1998), NFPA Standard 30 or ULC Standard C30-1995 shall be used to store flammable substances.

Containers of flammable substances will be stored in fire-proof cabinets and no appreciable combustible materials will be stored within 12 metres of any spark producing operation.

16.12.2 FLAMMABLE AND COMBUSTIBLE SUBSTANCES

Flammable substances are stored separately from ignition sources. When a flammable gas or a flammable liquid is handled, used, or stored, all sources of ignition must be eliminated or adequately controlled. Sources of ignition include open flame, spark-producing mechanical equipment, welding and cutting processes, smoking, static discharge and any electrical equipment or installation that is not approved for hazardous locations.

Flammable and combustible substances are stored separately from ignition sources or substances they might react with.

Any source of ignition is prohibited in areas where flammable and combustible sources are stored. This includes cigarette smoking, sparks from welding or grinding, open-flames, etc.

Flammable and combustible substances must be stored in areas away from substances that may cause a reaction, such as an oxygen tank.

Flammable and combustible substances must be stored in approved containers. Flammable and combustible chemicals must be stored in fire resistant cabinets or a designated storage room or building. Flammable liquids must be stored in a flammable storage cabinet with adequate ventilation.

COMPANY must ensure that flammable substances stored or used at the work area:

- will not be in sufficient quantity to produce an explosive atmosphere if inadvertently released
- are not stored within 30 metres of an underground shaft
- are not stored 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, and
- are stored only in containers approved to CSA Standard B376-M1980 (R2008), Portable Containers for Gasoline and Other Petroleum Fuels, NFPA Standard 30, Flammable and Combustible Liquids Code, 2008 Edition, or ULC Standard C30-1995, Containers, Safety, if manufactured on or after July 1, 2009.

Conductive containers are electrically bonded to each other or electrically grounded during transfer of contents. Metallic or conductive containers used to transfer flammable liquids must be electrically bonded to each other or electrically grounded while their contents are being transferred from one container to the other.

16.12.3 POTENTIALLY EXPLOSIVE ATMOSPHERES

Workers must not enter or remain in a work area if more than 20% of the lower explosive limit (LEL) of an explosive substance is present in the atmosphere. Where work or manufacturing processes involve the use of a flammable liquid, vapour, or gas, the concentration of the liquid, vapour, or gas in the work area shall not be greater than 20% of the lower explosive limit (LEL) of the substance involved.

If it is not practicable to maintain the airborne concentration of a flammable gas or vapour below the applicable exposure limit, for example, in a temporary situation or an emergency, only the minimum number of workers necessary for the work may be exposed and the concentration of the flammable gas or vapour must not exceed 20% of the lower explosive limit (LEL). See Hot Work.

16.13 PROCEDURES FOR HANDLING AND STORAGE OF COMPRESSED GASES AND CYLINDERS

All compressed gas cylinders will be stored in their appropriately marked secured (chained) locations and capped when not in use. If in use, all hook-up hoses and equipment used for hot-work purposes will be inspected prior to use. Defective equipment found shall not be used, but instead, tagged out of service or repaired before being used again.

There will be safe storage and handling of compressed and liquefied gas. COMPANY must ensure that:

1. Compressed or liquefied gas containers are used, handled, stored, and transported in accordance with the manufacturer's specifications.
2. A cylinder of compressed flammable gas is not stored in the same room as a cylinder of compressed oxygen.
3. Compressed or liquefied gas cylinders, piping, and fittings are protected from damage during handling, filling, transportation and storage.
4. Compressed or liquefied gas cylinders are equipped with a valve protection cap if manufactured with a means of attachment.
5. Oxygen cylinders or valves, regulators, or other fittings of the oxygen using apparatus or oxygen distributing system are kept free of oil and grease.
6. Oxygen is never to be used as a substitute for compressed air in pneumatic tools, to create pressure, for ventilating purposes or to blow out a pipeline.
7. All regulators and its flexible connecting hose are to be tested immediately after connections to a gas cylinder to ensure that there is no leak of the gas supply. If a leak of the gas supply develops during gas welding or an allied process, the supply of gas is immediately shut off by the worker performing the welding or allied process and the work is not resumed until the lead is repaired.
8. All storage cylinders for compressed gas shall be secured in an upright position.
9. The control valve of a storage cylinder for compressed gas, other than a cylinder connected to a regulator, supply line or hose, shall be covered by a protective cap that is secured in its proper position.
10. A spent storage cylinder shall not be stored inside a building.

No storage cylinder for propane shall be placed closer than three metres to a source of ignition or fire.

16.14 TRAINING

Employees are provided training on the fire safety plan. Control Tech shall ensure that:

- Designated persons and workers who have been assigned fire safety duties are adequately trained in, and implement, the fire safety plan;
- The fire safety plan is posted in a conspicuous place for reference by workers; and
- A fire drill is held at least once during each 12-month period.

Control Tech shall also provide training for:

- The proper use of portable fire extinguishers, for incipient (small stage) fire-fighting purposes only, upon initial hire and annually thereafter if they are required to use fire extinguishing equipment.
- The safe work procedures for fire, flammable substances and explosive hazards in the workplace including hot work and how to implement the procedures developed.

Retraining

Retraining shall re-establish worker proficiency and introduce new or revised control methods and procedures, as necessary. Retraining shall be provided for all authorized and affected workers whenever there is:

- An annual basis or a change in job assignment or
- Control Tech has reason to believe that there are deviations from or inadequacies in the worker's knowledge or use of fire extinguishers or fire prevention procedures.

Training Documentation

- All training will be documented and each worker's understanding will be subject to a "hands-on" test.
- Documentation will consist of: the worker's name, the trainer's name, the date of the training, and an outline of training provided. All training records will be maintained in the worker's safety file.

17.0 FIT FOR DUTY

17.1 PURPOSE

Control Tech full and part-time staff are expected to report for work fit for duty, which means able to perform their job duties in a safe, appropriate and an effective manner free from the adverse effects of physical, mental, or emotional problems. The material in this document does not take precedence over applicable government legislation which all employees must follow.

17.2 SCOPE

This procedure is applicable to all workers on all projects and operations.

17.3 RESPONSIBILITIES

17.3.1 ROLES AND RESPONSIBILITIES

The following addresses the roles and responsibilities of workers to report tiredness/fatigue to supervision and that supervision take appropriate action to assist the worker.

Management

- Management accepts responsibility for the implementation and enforcement of this fatigue management policy.
- Ensure policies and procedures are communicated to employees

Site Manager

- Responsible for the implementation and maintenance of this program for their site and ensuring all assets are made available for compliance with the program.
- Responsible and accountable for enforcing this procedure within their respective areas.
- Responsible for monitoring workers for unsafe behaviors, and removing workers from the job site, if necessary
- Take appropriate action to assist the worker who reports fatigue.
-

Workers

- Employees and contractors shall follow the requirements of this procedure.
- Workers must present in a fit state free from alcohol and drugs.
- Workers must never operate motor vehicles and/or heavy equipment while excessively fatigued.
- Workers must not chronically use over-the-counter, prescription drugs and any other product which may affect an employee's ability to perform their work safely, including fatigue that sets in after the effects of the drug wear off.
- Workers must report fatigue to their supervisor. Supervision must take appropriate actions to prevent loss.
- Workers need to be rested prior to starting work.

17.3.2 DEFINITIONS

Accumulated sleep debt - Shortened or disrupted sleep that adds up over time.

Automatic Behaviour - A situation where the worker is completing routine tasks but is not having any conscious thoughts.

Competency - The ability of a worker to carry out a job with a certain, accepted level of expertise.

Fatigue - A state of reduced mental and physical alertness or functioning caused by sleep-related disruption or deprivation. Fatigue is a feeling of tiredness or exhaustion that comes from physical or mental exertion. It is a message to the body to rest. Fatigue can be aggravated by acute lack of sleep or an accumulated sleep debt.

Fitness for duty - A medical assessment done when an employer wishes to be sure an employee can safely do a specific job or task in a manner which does not threaten the safety or health of his or her self, co-workers, property, or the public at large.

Microsleeps - A state of up to 60 seconds where the brain goes to sleep and the worker blacks out no matter what they are doing.

Optimum scheduling - Schedules that align to normal human sleep patterns and social compatibility, in addition to operational efficiency and effectiveness.

Short rotation - A short rotation would involve no more than three night shifts in a row.

Simple or monotonous tasks - Routine tasks lasting half an hour or more.

Sleep disorder - Physical or neurological sleep problems such as insomnia, sleep apnea, REM behaviour disorder, sleepwalking, restless legs syndrome, or periodic limb movement syndrome may increase fatigue.

Social compatibility - The degree to which there is a match with a group or person's lifestyle preferences, fundamental rights and principles.

17.4 FIT FOR WORK ASSESSMENT

The purpose is to determine if medically the employee can perform the job or task under the working conditions. Fit to work assessments are most often done to determine medical fitness after an illness or injury, but are sometimes done after employment has been offered, as requested by the employer, or as a condition of a job transfer.

Control Tech is allowed to ask for information from a medical professional to make sure the employee is able to work safely, and that the employee's condition does not pose a hazard to themselves or to others. A fit to work assessment may be done for but are not limited to the following reasons:

- There has been a significant change in the working conditions.
- An employee transfers to a position where the working conditions are significantly different.
- The job at work has been modified and the returning worker is still going for physiotherapy, rehabilitation, or both.
- There has been a change in an employee's health (e.g., returning to work after recovery from a serious illness or injury).
- A medical condition may limit, reduce or prevent the person from performing a new or current job effectively (e.g., musculoskeletal conditions that limit mobility).
- A medical condition is likely to make it unsafe to do the job (e.g., a person may unpredictably become unconscious in a hazardous situation).
- A medical condition is likely to make it unsafe both for him/her self, co-workers or the public (e.g., driving is essential to the job but the person is subject to unpredictable and sudden unconsciousness, or a food product inspection by an inspector with deficient colour vision).
- The medical condition may be made worse by the job (e.g., excessive physical exertion by an employee with a heart or lung disorder).

The employee will visit a medical professional who will determine if the person is able to do a particular job. The medical professional may consider physical or mental abilities, sensory acuity, level of skill, functional limitations, etc.

The medical professional will typically only report one of three conditions back to the employer:

- fit
- unfit or
- fit subject to work modifications

17.5 FIT FOR DUTY SAFE WORK PRACTICES

Competency

Control Tech's policies and procedures are communicated to employees.

Workers must be qualified and competent to perform their job. Control Tech must ensure that workers have the necessary education, experience and training to perform their job tasks.

Physically & Mentally Capable

Workers must be physically capable of performing their job as well as mentally capable. A worker with a physical or mental impairment which may affect the worker's ability to safely perform assigned work must inform his or her supervisor or Control Tech of the impairment and must not knowingly do work where the impairment may create an undue risk to the worker or anyone else.

A worker must not be assigned to activities where a reported or observed impairment may create an undue risk to the worker or anyone else.

A Physical Demands Analysis (PDA) should be prepared for each job duty to ensure workers are placed accordingly. PDAs will be arranged through the Safety Manager.

Medication Reporting Requirements

Workers must notify their supervisor if they are taking prescription or over-the-counter medication that may impair their ability to work safely. Employees must report all medications they are taking.

Over-the-counter medications such as allergy or cold and flu medications could also impair one's ability to perform safely and must also be reported to their supervisor.

All workers are required to notify Control Tech before reporting for work or prior to using transportation to get to work or if when on the job if they are taking or issued any prescription, non-prescription or any other medication or suffer fatigue to the point that would affect their ability to perform their job safely.

The supervisor shall immediately notify Control Tech to ensure reported or observed impairment is effectively managed.

Drugs and Alcohol

Workers are prohibited from entering the workplace while under the influence of drugs or alcohol. A person must not enter or remain at any workplace while the person's ability to work is affected by alcohol or drug so as to endanger the person or anyone else. Workers will be held accountable for their behaviour through our disciplinary program. If an impaired person is discovered they will be removed from the worksite immediately. Control Tech will ensure the worker or other person is offered safe alternative transportation off the work site in order not to present a danger to others (driving while intoxicated, etc.). If they do not leave the worksite the appropriate authorities will be contacted.

Employee Activity and Behavior

Control Tech is responsible for monitoring workers for unsafe behaviors and removing workers from the job site, if necessary. Employee's activities and behaviors will be monitored to determine if employee(s) should be removed from the work site.

Workers are prohibited from entering the workplace while under the influence of drugs or alcohol. Control Tech must ensure that no person enters or remains at the job site while under the influence or drugs and/or alcohol.

Employee Assistance

Control Tech will provide assistance to workers who are unable to safely perform their job duties. If an employee is determined to be unfit for duty, management follows a process that is in place to provide reasonable assistance to the employee. This includes, but is not limited to, transferring the worker to another role, providing a leave of absence, Employee Assistance Programs, etc.

Control Tech will review each matter on a case by case basis.

Disciplinary action may occur for an employee reporting to work in a condition which could endanger their safety or the safety of any other person(s).

18.0 FORKLIFTS

18.1 PURPOSE

This program is written to provide directives to managers, supervisors and employees about their responsibilities in the operations of forklifts. These forklifts are also commonly identified as PITs, pallet trucks, rider trucks, fork trucks, lift trucks, "Jeeps," and other local terms. These vehicles and material handling equipment have the potential to cause or be involved in serious accidents and injuries. This program provides procedures and training to control and reduce the risk of accidents and injuries. The material in this document does not take precedence over applicable government legislation which all employees must follow.

18.2 SCOPE

This program applies to all operators and supervisors of forklift operations within Control Tech including temporary employees and any contractors working for Control Tech. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

18.3 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the forklift program. These procedures are kept in the designated safety manager's office.
- Arranging for training
- Maintaining training record
- Program evaluation and updating, as types of PITs change

Site Supervisor

- Responsible for the implementation and maintenance of the program for their site and ensuring all assets are made available for compliance with the plan.
- A supervisor must not knowingly operate or permit a worker to operate the forklift which is, or could create, an undue hazard to the health or safety of any person, or is in violation of this Regulation.
- Creating and designating job assignments to qualified operators that are trained and certified to operate specific PITs
- Ensuring that daily checklists or inspections are conducted prior to PIT use.
- Assuring that PITs requiring service are taken out of service for repairs;

Maintenance Supervisor

- Duties of the maintenance supervisor include:
- Scheduling and performing preventative maintenance and repairs;
- Maintaining maintenance and service records.

Operator

- Shall be familiar with this program.
- Follow all guidelines & requirements set out in this program
- Report unsafe conditions and follow all posted requirements.
- Make sure you are adequately trained before operating a forklift
- Must operate the equipment safely, maintain full control of the equipment, and comply with the laws governing the operation of the equipment.

18.4 TRAINING

A forklift operator must be certified as competent by the company before being allowed to operate a forklift. Forklift operator must demonstrate to a qualified supervisor or instructor, competency in operating the equipment. The training at Control Tech includes practical, hands on training including instructor demonstrations and trainee exercises.

A person must not operate the forklift unless:

- The person has received adequate training in the safe use of the equipment in accordance with legislation requirements (where applicable) and is certified.
- A trainee must operate the equipment only under the supervision of a qualified instructor, or a supervisor.
- Operator of the forklift must be familiar with the operating instructions for the equipment, and has been authorized to operate the equipment.

18.5 PRE USE INSPECTION

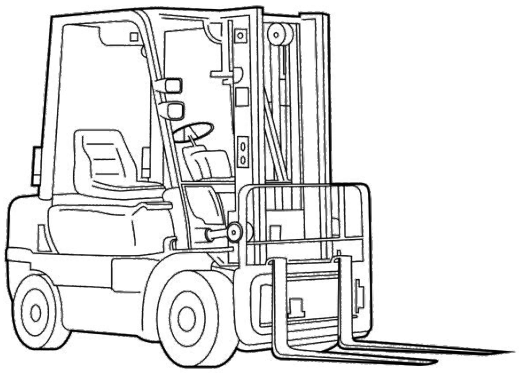
Pre-job inspections must be completed at the beginning of each shift. The inspection includes a predetermined checklist of items to be checked before each shift.

Forklift must not be operated if any defects or deficiencies are found during the inspection until those defects or deficiencies have been rectified by a qualified person.

These inspections must be documented.

18.6 SAFE WORK PRACTICES FOR OPERATING FORKLIFT

DO



- Know the recommended load limit of the forklift and never exceed it.
- Know how to assess the weight of the load to be lifted.
- Do a visual and operational check of the forklift at the start of the shift.
- Always inspect and wear any seat belt or operator restraint device/system when these devices are available on the forklift truck.
- Know how to properly enter and leave the vehicle.
- Look ahead for any obstructions or restrictions that might be in the path you are going to travel (e.g., slippery floors, items in the path, weight restrictions for floors, dock or bridge plates, elevators, etc.).
- Check for adequate overhead clearance before raising the load.
- Operate a forklift smoothly when stopping, starting, lifting and tilting.
- Know the blind spots of the lift truck with and without a load.
- Use corner mirrors, back-up alarms, buzzers and warning lights to help prevent collisions.
- Keep pedestrians away from a forklift in operation. Operate with extreme caution when near pedestrians.
- Stop when anyone crosses the route being travelled. Lower the load to the floor, and wait until clear.
- Operate at a safe speed, taking into consideration all conditions.

- If loading another vehicle (e.g., transport truck), verify that the load wheels on the other vehicle are chocked before driving into the space.
- Use proper procedures when travelling on inclines or ramps. See Forklift Trucks - Maintaining Truck Control.
- Ensure that the fire exits, stairways, and fire equipment are not blocked by the truck or the load.
- Wear leather gloves when moving or shifting loads or when checking skids.
- Wear fully laced safety boots to give impact protection when moving loads or skids and to provide ankle support when mounting and dismounting lift truck.
- Remain alert and prepare for the unexpected.
- Note anything that affects the normal operation of the forklift and tell the supervisor immediately.
- Keep hands, arms, head, feet and legs inside the confines of a moving forklift.
- Stay in the truck in case of overturn.
- Report any collisions, damage or near-miss accidents to a supervisor immediately.

DO NOT

- Do Not operate a forklift if you have not been trained and are certified as qualified to operate
- Do Not operate a lift truck that does not have capacity rating information.
- Do Not travel with the load raised more than ten centimetres (4 inches) from the floor.
- Do Not leave the vehicle unattended while running or loaded.
- Do Not allow unauthorized persons to operate the vehicle.
- Do Not try to move or adjust any part of the load, the forklift or the surroundings when on the forklift.
- Do Not lift a load that extends above the load backrest unless no part of the load can possibly slide back toward the operator.
- Do Not allow anyone but the operator to ride on the forklift.
- Do Not use pallets elevated by forklifts as an improvised working platform.
- Do Not allow anyone to stand or walk under the elevated part of any forklift, whether loaded or unloaded.

18.7 COMMON CONTRIBUTING FACTORS OF FORKLIFT ACCIDENTS

- Lack of training or improper training of workers who have to operate forklift trucks.
- Production factors such as speed or stress.
- Lack of proper tools, attachments and accessories.
- Improper assignment of forklifts and operators.
- Poor maintenance of forklifts.
- Age of forklifts.

Behavioural and operational factors

- Improper backing up techniques.
- Improper turning.
- Improper warnings to others about a forklift in use nearby.
- Poor communication during shared tasks, or in shared spaces.
- Riding or giving rides on forklift or load.
- Parking the forklift improperly.
- Improper blocking of wheels on semi-trailers or railway cars.
- Horseplay; stunt driving; jerky, erratic driving.
- Inadequate servicing of the forklift.

Workplace designs

- Narrow aisles.
- Crowded, cluttered aisles.
- Obstructions at intersections and doors.
- Volume of traffic in work area.
- Walking and working in the general area of forklift operations.
- Other workplace conditions such as noise, odours, toxic gases, dust, or poor lighting.
- Many ramps with different surfaces.
- Condition of loading dock.

Characteristics of the load

- Poorly stacked or piled on the pallet.
- Pallets in poor repair.
- Load too heavy.
- Load unstable or blocking vision.

Mechanical conditions or design features

- Malfunction of brakes.
- Malfunction of steering.
- Malfunction of clutch, shift linkage, or transmission.
- Malfunction of mast assembly.
- Leaks in hydraulic systems or transmission.
- Safety devices lacking, inadequate, or malfunctioning.
- Emissions from forklifts.
- "Blind spots" or obstructions blocking driver's view.
- Poor layout of controls and displays.

18.8 LOAD HANDLING & RATING

- Load handling attachments
- Buckets, forks and other load handling attachments must only be installed on forklift as specified by the equipment manufacturer or when certified by a professional engineer for use on the equipment.

18.9 LOAD RATINGS

- Mobile equipment designed and used for lifting, hoisting or similar operations must have a permanently affixed notation, legible and visible to the operator, stating the rated load of the equipment.
- A load chart must be displayed in the operator's cab if the rated load varies with the reach of the equipment.
- If the equipment is modified the employer must ensure that the rated load and load chart are changed as necessary to reflect the new load ratings.
- Guidelines and Tips for Operating Forklift

19.0 GAS HAZARDS

19.1 PURPOSE

It is the intention of Control Tech to provide gas hazards training and detection equipment to minimize risk to our employees. This program is associated with our Respiratory Protection Program.

19.2 SCOPE

This procedure applies to Control Tech operations where employees whose work activities exposes them to gas hazards. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

19.3 HAZARDS

- Workers cannot rely on their senses to alert them to hazards in the workplace.
- Exposure to excessive levels of toxic gas or an oxygen-deficient environment can cause workers serious illness and even death.
- Combustible gas explosions are often catastrophic, injuring or killing personnel and destroying property.

19.4 GAS HAZARDS EQUIPMENT

- A personal portable gas detector shall be used in high gas hazard areas. Each employee shall use a portable gas detector as required in all high gas hazard areas.
- All gas monitors shall and must be calibrated per manufacturer's recommendations and have a current calibration sticker on the monitor providing the date of calibration.
- Daily bump tests are performed on all gas monitors that are to be used to ensure the monitor and alarms are working correctly.
- Bump test are required to be completed at the beginning of each day the monitor is in use per the requesting owner client and manufacturer's guidelines to ensure the monitor is functioning correctly.

19.5 USE, MAINTENANCE AND CARE OF GAS MONITORS

- Only utilize monitors issued by either Control Tech or made available by the Owner Client - no personal monitors are allowed.
- Have the gas monitor on the outside of all clothing.
- Check the calibration date prior to bump testing. If the calibration date is expired turn the unit in immediately and do not use.
- Bump test each shift prior to using the monitor.
- Monitors are sensitive equipment - avoid physical damage and immediately report any monitor that does not appear to be performing as expected.

19.6 TRAINING

Workers are trained on procedures to be followed in the event of an uncontrolled release. Employees will be aware of the owner's contingency plan provisions including evacuation routes and alarms. Employees should participate in emergency evacuation drills and practice rescue procedures.

Workers are provided training on the hazardous gases they may be exposed to on the job. Workers shall be informed of the hazardous gases they may be exposed to on the job. This training should be provided initially, and annually thereafter.

Everyone using gas monitors will be trained and tested in their knowledge of bump testing & calibration of the units they are assigned

Gas Hazards training includes gas characteristics, health effects and personal protective equipment (PPE) requirements. Training shall address, as a minimum:

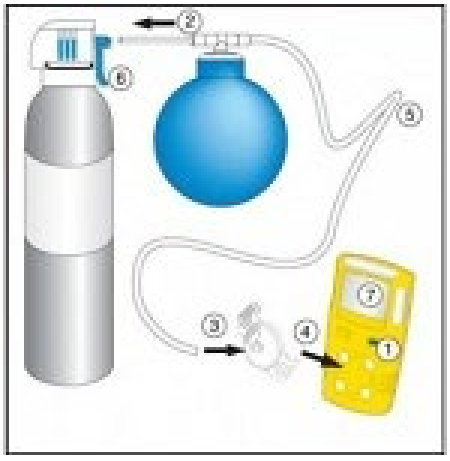
- Locations of alarm stations
- Gas Monitoring Equipment- Portable and Fixed Detection
- Proper methods of calibration.
- Gas Alarms
- Gas Hazards - Characteristics of gases. Include, at minimum: oxygen deficiency, oxygen or nitrogen enrichment, carbon monoxide and hydrogen sulfide. Hazard training must also include any plant-specific gases or department-specific gases of concern. Training must include signs and symptoms of overexposure.
- Personnel Rescue Procedures
- Use and care of Self-Contained Breathing Apparatus (SCBA) - includes donning and emergency procedures (if applicable)
- Evacuation Procedures - Employees will be aware of the owner's contingency plan provisions including evacuation routes and alarms. Employees should participate in emergency evacuation drills and practice rescue procedures.
- Staging Areas – Primary and Secondary

Gas Hazard Awareness annual training shall be documented and available for review.

19.7 PORTABLE GAS DETECTOR BUMP TEST & CALIBRATION

19.7.1 BUMP TEST

A Bump Test - a qualitative function check in which a challenge gas is passed over the sensor(s) at a concentration and exposure time sufficient to activate all alarm settings.



The bump test is the process that verifies “the performance of the gas detector and ensures that sensors are responding to their target gas.” For example, an H2S sensor is exposed to H2S gas to verify it can respond.

A bump test should be conducted before each day’s use or in accordance with the manufacturer’s instructions.

Designed to protect workers from such unforeseen dangers, gas monitoring instruments are often utilized to measure, monitor and indicate the concentration of certain gases in the atmosphere.

It is vital to worker safety that these instruments are maintained and calibrated properly. In addition, performance of a daily bump test prior to use of gas detectors is a best practice because it is the only method by which the entire system — instrument, sensors, flow path, power source, alarms and all electronics — can be checked to ensure it is functioning properly and that gas can reach the sensor. Additionally, bump testing

and calibration records can be recorded on most detectors to help to ensure compliance, traceability and proper record-keeping.

19.7.2 REASONS FOR BUMP TESTING

Instrument inaccuracy due to improper or irregular calibration can lead to serious accidents.

Over time, the accuracy of gas detection instruments can diverge from their calibration settings in several ways.

The following are the potential failure modes that can be identified during a bump test:

1. Gradual chemical degradation of sensors and drift in electronic components that occur naturally, over time;
2. Chronic exposures to, and use in, extreme environmental conditions, such as high/low temperature and humidity, and high levels of airborne particulates;
3. Exposure to high (over-range) concentrations of the target gases and vapors;
4. Chronic or acute exposure of catalytic hot-bead LEL sensors to poisons and inhibitors. These include: volatile silicones, hydride gases, halogenated hydrocarbons, and sulfide gases;
5. Chronic or acute exposure of electrochemical toxic gas sensors to solvent vapors and highly corrosive gases;
6. Harsh storage and operating conditions, such as when an instrument is dropped onto a hard surface or submerged in liquid. Normal handling/jostling of the equipment can create enough vibration or shock over time to affect electronic components and circuitry; and
7. Any general component failure.

NOTE: paint, aerosols, mud and other debris will frequently block sensor inlets.

19.7.3 REINFORCE SAFETY PRACTICES

Safety practices also need to be reinforced regularly. Far too often, gas alarms are viewed as a nuisance or an error and are ignored by workers.

It is critical that workers comprehend the fact that the detector is utilized for their safety. Following safety protocol when alarms are triggered is a critical safety practice and could prove to be lifesaving.

19.7.4 CALIBRATION DRIFT AND CAUSES

Calibration Drift - When an instrument's reference point shifts, the reading will shift accordingly and be unreliable. It happens to all sensors over time. An instrument that experiences calibration drift can still measure the quantity of gas present, but it cannot convert this information into an accurate numerical reading.

Calibration checks or full calibration with a traceable gas concentration will verify or update the instrument's reference point.

Operators should conduct these procedures daily, or more frequently if needed, to ensure that the instrument will continue to produce accurate readings.

Calibration drift occurs most often because of:

- Degradation caused by exposure to phosphates
- Degradation of phosphorus-containing components

- Degradation of lead-containing components
- Gradual chemical degradation of sensors and drift in electronic components that occur normally over time.
- Use in extreme environmental conditions, such as high/low temperature and humidity, and high levels of airborne particulates.
- Exposure to high concentrations of the target gases and vapors.
- Exposure of catalytic hot-bead LEL sensors in the instruments to volatile silicones, hydride gases, halogenated hydrocarbons, and sulfide gases.
- Exposure of electrochemical toxic gas sensors to solvent vapors and highly corrosive gases.
- Handling/jostling of the equipment causing enough vibration or shock over time to affect electronic components and circuitry.

Operators should validate a DRPGM's operability when any of these conditions occurs, or is suspected, during use.

When attempting to calibrate an instrument after exposure to these conditions, the sensor often will either display a failure message or will not allow the operator to fully adjust the display reading.

Harsh operating and storage conditions can affect instrument performance, leading to inaccurate readings or even failure. While a DRPGM may appear undamaged during visual inspection, it actually could be damaged internally. At this point, the operator should replace the damaged sensor or have qualified personnel service the sensor.

Be sure to follow the manufacturer's instructions regarding sensor replacement and servicing.

19.7.5 Worker Safety - The Number One Reason for Proper and Regular Calibration

The primary reason for proper, regular instrument calibration is to provide accurate gas-concentration readings that could prevent worker illness, injury, or death.

Correctly calibrating an instrument helps to ensure that the DRPGM will respond accurately to the gases it is designed to detect, thereby warning users of hazardous conditions before the conditions reach dangerous levels. Some DRPGMs have two levels of alarms – warning and danger. The warning alarm alerts the operator and workers that the work environment has a detectable elevated concentration of toxic gas and is, therefore, potentially hazardous. The danger alarm indicates that the toxic-gas concentration exceeds the programmed hazard threshold, and that the toxic gas in the work area is above the warning level and approaching a hazardous level. Whether a DRPGM provides a warning or danger alarm at the proper concentration depends on its detection capabilities, its ability to translate its findings into an accurate reading, and the presence of interfering gases (see "Calibration Drift and Causes" above).

19.8 Bump Tests, Calibration Checks, and Full Calibration

19.8.1 Bump Test (or Function Check)

This is a qualitative function check in which a challenge gas is passed over the sensor(s) at a concentration and exposure time sufficient to activate all alarm settings.

The purpose of this check is to confirm that gas can get to the sensor(s) and that all the instrument's alarms are functional.

The bump test or function check does not provide a measure of the instrument's accuracy. When performing a bump test, the challenge gas concentration should trigger the DRPGM's alarm(s).

19.8.2 CALIBRATION CHECK OR FULL CALIBRATION

Check or Full Calibration

There are **two methods** for verifying DRPGM accuracy: a calibration check and a full calibration. Each method is appropriate under certain conditions.

A calibration check verifies that the sensor(s) and alarms respond within the manufacturer's acceptable limits by exposing the instrument to a test gas.

The operator compares the reading to the test-gas concentration (as indicated on the cylinder containing the test gas). If the instrument's response is within the acceptable range of the test-gas concentration (typically ± 10-20% of the test-gas concentration), then the calibration check verified the instrument's accuracy.

Note: operators need to check with the instrument's manufacturer for the acceptable tolerance ranges. An operator should "zero" an instrument (reset the reference point, in some cases "zero air" gas may be needed) before conducting the calibration check to ensure that the calibration check results are accurate.

When performing a calibration check, the test-gas concentration should be high enough to trigger the instrument's alarm(s).

If the calibration-check results are not within the acceptable range, the operator should perform a full calibration. A full calibration adjusts the instrument's reading to coincide with a known concentration (i.e., certified standard) of test gas. Test gas used for calibration gas should always be certified using a standard traceable to the National Institute of Standards and Technology (NIST).

When to Perform a Bump Test and When to Perform a Full Calibration

A bump test or calibration check of portable gas monitors should be conducted before each day's use in accordance with the manufacturer's instructions." If an instrument fails a bump test or a calibration check, the operator should perform a full calibration on it before using it.

If the instrument fails the full calibration, the worker should inform his/her supervisor and should remove it from service. Contact the manufacturer for assistance or service.

19.8.3 CALIBRATION RULES

The following are a few basic calibration rules for DRPGMs:

Follow the manufacturer's guidelines for proper calibration.

Operators cannot perform any job, including DRPGM calibration, properly or safely without the right tools.

The type and concentration of calibration test gas, sample tubing, flow regulators, and calibration adapters are key links in the calibration chain.

Operators should conduct any testing to verify the operation of the gas monitor in an environment that is the same as (or similar to) the working conditions (e.g., temperature, humidity, atmospheric pressure).

Only use a certified traceable test gas, and do so before its expiration date.

The instrument can only be as accurate as the test gas used to calibrate it.

Be certain that the supplier can provide a certificate of analysis for every test-gas cylinder.

The concentration of the test gas, particularly reactive gases such as hydrogen sulfide and chlorine, will only remain stable for a limited period.

Never use a test gas after its expiration date.

Most instruments are designed to be field calibrated with detailed instructions provided in the manufacturer's user manual, training videos, or computer-based training modules.

20.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

20.1 PURPOSE

This program is written to be in compliance with general health and safety requirements and provide directives to managers, supervisors, and employees about their responsibilities in the operations and management of Control Tech facilities as related to the indicated general safety requirements. The material in this document does not take precedence over applicable government legislation which all employees must follow.

20.2 SCOPE

This program applies to all employees of Control Tech, temporary employees and any contractors working for Control Tech. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

20.3 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the General Safety Requirements program.
- These procedures are kept in the designated safety manager's office.

Site Manager

- Responsible for the implementation and maintenance of the plan for their site and ensuring all assets are made available for compliance with the plan.

Employees

- All shall be familiar with this procedure and the local workplace General Safety Requirements program.
- Follow all requirements, report unsafe conditions, and follow all posted requirements.
- Shall use the safeguards, safety appliances and personal protective equipment while following all safe work practices and procedures for the workplace.

Control Tech Employer Responsibilities and Requirements

Control Tech will provide workers with ready access to a copy of the Provincial Occupational Health and Safety (OHS) legislation for the area in which they are working.

A supervisor shall ensure that a worker works in the manner and with the protective devices, measures and procedures required by Control Tech and uses or wears the equipment, protective devices or clothing that Control Tech requires to be used or worn.

20.4 COMPETENCY AND TRAINING

Workers are qualified and trained to perform their job tasks. If work is to be done that may endanger a worker, Control Tech must ensure that the work is done by a worker who is competent to do the work or by a worker who is working under the direct supervision of a worker who is competent to do the work. Control Tech must ensure that a worker is trained in the safe operation of the equipment the worker is required to operate.

Training must include procedures to be taken in the event of a fire or other emergency, the location of first aid facilities, identification of prohibited or restricted areas, precautions to be taken for the protection of the worker from physical, chemical or biological hazards, any procedures, plans, policies and programs that Control Tech is required to develop and any other matters that are necessary to ensure the health and safety of the worker while the worker is at work.

20.5 EMPLOYEE GENERAL DUTIES

A worker shall use the safeguards, safety appliances, and personal protective equipment provided in accordance with the Provincial Occupational Health and Safety (OHS) legislation.

Workers are prohibited from entering the workplace while under the influence of drugs or alcohol. A person must not enter or remain at any workplace while the person's ability to work is affected by alcohol, a drug, or other substance so as to endanger the person or anyone else.

All workers shall engage in proper activity or behaviour. Improper behaviour that might create or constitute a hazard to any person is not acceptable. Improper activity or behaviour includes horseplay, scuffling, fighting, practical jokes, and unnecessary running or jumping.

20.6 INSPECTIONS AND UNSAFE ACTS AND CONDITIONS OBSERVED

Workplace inspections are performed on a regular basis. Control Tech must ensure that regular inspections are made of all workplaces, including buildings, structures, grounds, excavations, tools, equipment, machinery and work methods and practices, at intervals that will prevent the development of unsafe working conditions.

Unsafe acts and conditions observed during workplace inspections are corrected immediately. Unsafe or harmful conditions found in the course of an inspection must be remedied without delay. Whenever a person observes what appears to be an unsafe or harmful condition or act the person must report it as soon as possible to a supervisor or to Control Tech, and the person receiving the report must investigate the reported unsafe condition or act and must ensure that any necessary corrective action is taken without delay.

Drugs or Alcohol

Workers are prohibited from entering the workplace while under the influence of drugs or alcohol. A person must not enter or remain at any workplace while the person's ability to work is affected by alcohol, a drug, or other substance so as to endanger the person or anyone else.

20.7 MANUALS AND INFORMATION

If a regulation requires an operation or maintenance manual for a tool, machine or piece of equipment, Control Tech must ensure that before the tool, machine or piece of equipment is used in the workplace

- the manual has been obtained
- the supplier has provided sufficient information to identify the standard or standards to which the tool, machine or equipment has been manufactured

20.8 CONFORMITY TO STANDARDS

If a regulation requires that a tool, machine or piece of equipment manufactured before April 15, 1998 must meet a code or standard, the tool, machine or piece of equipment must conform to the edition of the code or standard referred to in the regulation or code or standard published at the time the tool, machine or piece of equipment was manufactured.

20.9 INDUSTRIAL HYGIENE

Where a worker is exposed to a potential hazard of injury to the eye due to contact with a biological or chemical substance, an eyewash fountain shall be provided.

A worker who may be exposed to a biological, chemical or physical agent that may endanger the worker's safety or health shall be trained to use the precautions and procedures to be followed in the handling, use and storage of the agent, in the proper use and care of required personal protective equipment, and in the proper use of emergency measures and procedures.

No food, drink or tobacco shall be taken into, left or consumed in any room, area or place where any substance that is poisonous by ingestion is exposed.

Protective clothing or other safety device that has been worn next to the skin shall be cleaned and disinfected prior to being worn by another worker.

Workers who handle or use corrosive, poisonous or other substances likely to endanger their health shall be provided with washing facilities with clean water, soap and individual towels.

20.10 DRESS CODE/APPROPRIATE WORK WEAR

The Dress Code policy is designed to maintain and perpetuate the reputation of Control Tech employees. All employees will follow the company Dress Code. By adhering to professional standards of dress, safety, and hygiene all employees will project competence and credibility during their interactions with customers, colleagues, and the general public.

All levels of management, including department managers and supervisors are responsible for teaching, role modeling and enforcing the Dress Code policy through consistent application.

Managers and supervisors may prohibit workers from working until they change into appropriate attire or make other adjustments necessary to comply with policy. The employee may be required to leave the worksite without pay until returning in appropriate attire.

Standards of dress and appearance are dependent on position held in company and will be communicated to position applicants during the interview process and to newly hired employees as part of their orientation. Failure to comply with these standards or specific department dress code will result in progressive disciplinary action.

Neat and clean dress demonstrates pride in the job and is a courtesy to those around you.

Clothing worn by all employees must be neat, clean, wrinkle free and in good condition, free from offending odors, and fit properly and keep the body covered, and not show underwear.

20.10.1 EXAMPLES OF INAPPROPRIATE DRESS THAT MAY BE OFFENSIVE AND UNPROFESSIONAL INCLUDE:

- Mini-skirts
- Dresses or skirts with excessively high slits
- Excessively tight, sheer, or revealing clothing, low cut/slung garments
- Fish-net stockings
- Leggings, stretch pants. spandex, and any pants above the calf
- Shorts or cut-offs
- Pants worn below hip level (''sagging'') or excessively loose clothing
- Halter tops, tank tops, low cut or see-through blouses/shirts. muscle shirts, shirts that expose the midriff, clothing that exposes undergarments or could be perceived as sexually provocative to a reasonable person

- Faded, tie-dyed, bleached, torn, ripped, frayed, patched, un-hemmed clothing or clothing that gives an unkempt appearance.
- Clothing, including t-shirts, sweatshirts, caps, jackets, etc. with offensive/suggestive images or messages, clothing with logos for alcoholic beverages, tobacco products, nudity, or illegal substances.
- Inappropriate undergarments that have unprofessional appearance.

20.10.2 EXAMPLES OF APPROPRIATE DRESS:

Clothes appropriate to the job being completed.

- Suits
- Dress pants, no more than 3" above the ankle
- Business casual dress pants (i.e., Dockers, chinos, khakis)
- Skirts
- Casual dresses
- Dress shirts. ties
- Denim blue jeans, skirts, or jackets, including "dark wash" denim may be acceptable if they are clean and in good condition with no holes, ragged hems, frayed or patches.
- T-shirts, sweat shirts, caps, jackets, etc.
- Button up blouses
- Collared polo shirts
- Sweaters. vests
- Sports coats, blazers
- Collared shirts, sweaters and pants
- Tucked in shirt-tails

20.10.3 JEWELRY AND ACCESSORIES

- Jewelry and accessories must not pose a physical hazard.
- EQUIPMENT OPERATORS MAY NOT wear rings, necklaces, dangly earrings or other jewelry.
- Jewelry worn by employees must be reasonable shape and size, appropriate to the work setting and may not interfere with job performance or safety.
- Earrings and small nose studs are the only acceptable forms of visible or detectable pierced jewelry.
- Rings must be small enough to allow for the use of gloves, with no risk of tearing the gloves.
- Wallet chains or any hard chain apparel, including, but not limited to, metal chain belts and clothing ornaments are not permitted.
- Managers also have the discretion to require that an employee cover any tattoo(s) or combination of tattoos that could be considered offensive.

20.10.4 GROOMING AND PERSONAL HYGIENE:

Good personal hygiene is required. Customers, other employees and visitors have a right to expect general cleanliness and good dental hygiene from the workers.

Every individual must be physically clean, well groomed, and take steps to ensure appropriate general body hygiene (cleanliness, lack of offensive body/mouth odor, cigarette or cigar smoke odor, etc.)

Every individual should avoid excessive use of fragrances, and must be sensitive to scented chemicals that may be offensive, cause allergic, or other adverse reactions for patients, visitors, or staff.

Excessive makeup should be avoided.

In most instances, an employee may wear his or her hair the way he or she chooses while working, as long as it remains well trimmed, well groomed, and business-like in appearance. Long hair must not obstruct vision and must be controlled to prevent contact with the patient, equipment, or supplies. A hair net may be required in certain settings.

Beards, mustaches, and sideburns are to be neatly trimmed and groomed and should not interfere with job performance and safety.

Artificial nails may not be worn by staff involved with direct patient care. Fingernails should be trimmed, clean and neat, should not interfere with job performance and should comply with the Infection Control fingernail policy.

Proper handwashing techniques are important for personal safety and control of infection.

If a worker may be required to use a respirator for work or emergency situations the facial hair below must be adhered to:

For safety reasons, all employees must wear shoes and or safety boots that are appropriate to their job. Shoes and or safety boots should promote a professional appearance, and be clean and in good repair.

20.11 REFUSAL TO WORK

Workers have the right to refuse unsafe work. A person must not carry out or cause to be carried out any work process or operate or cause to be operated any tool, appliance or equipment if that person has reasonable cause to believe that to do so would create an undue hazard to the health and safety of any person.

Work refusals must be reported to a supervisor and immediately investigated. A worker who refuses to carry out a work process or operate a tool, appliance, or equipment must immediately report the circumstances of the unsafe condition to his or her supervisor or a Control Tech representative. A supervisor or Control Tech representative receiving a report must immediately investigate the matter and ensure that any unsafe

condition is remedied without delay or if in his or her opinion the report is not valid must so inform the person who made the report.

20.12 INCIDENTS AND INVESTIGATIONS

Except to the extent necessary to free a trapped person or to avoid the creation of an additional hazard, Control Tech must ensure that nothing involved in a serious incident is altered or moved until at least 24 hours after the notice is given.

Control Tech shall prepare a written report that includes a description of the incident, any graphics photographs or other evidence that may assist in determining the cause or causes of the incident, an explanation of the cause or causes of the incident, the immediate corrective action taken, and any long-term action that will be taken to prevent the occurrence of a similar incident or the reasons for not taking action.

Control Tech must ensure that each of the following is investigated as soon as reasonably practicable after it occurs - a serious incident, an incident that requires a worker to be admitted to a hospital as an in-patient for a period of 24 hours or more, an accident or other dangerous occurrence that injures a person, and results in the person requiring medical treatment or that had the potential to cause a serious incident.

20.13 EQUIPMENT MAINTENANCE

Control Tech is responsible to provide equipment that is maintained in a safe condition and is appropriate to the work performed. Control Tech must ensure that all equipment used at a work site is maintained in a condition that will not compromise the health or safety of workers using or transporting it, will safely perform the function for which it is intended or was designed, it is of adequate strength for its purpose and is free from obvious defects.

Defective equipment is removed from service immediately. Where a defect is found in equipment, Control Tech shall ensure that steps are taken immediately to protect the health and safety of any worker who may be at risk until the defect is corrected and the defect is corrected by a competent person as soon as is reasonably practicable.

Whenever workers are present at a worksite Control Tech will provide lighting that is sufficient to protect the health and safety of workers and suitable for the work to be done at the worksite.

20.14 GENERAL FACILITY REQUIREMENTS

20.14.1 HOUSEKEEPING

The work site is kept free of hazards that could cause slips, trips, or falls. Floors, platforms, ramps, stairs, and walkways available for use by workers must be maintained in a state of good repair and kept free of slipping and tripping hazards. If such areas are taken out of service, Control Tech must take reasonable means for preventing entry or use.

<u>Other Ways of Preventing Slipping Tripping Falling:</u>

- Watch Where You Walk
- Wear Proper Footwear
- Check floor openings
- Be Careful on Stairs
- Use ladders correctly by following the procedures
- Always use 3 point dismount from machines
- Keep walking surfaces clean

- Walking surfaces should be suitable for the pushing, pulling and carrying tasks performed on them
- Rough textured surfaces may reduce the potential for slips but increase the risk of trips.
- Keep as few objects as possible on walking and working surfaces
- Watch for changes in walking surface height, a change as much as 1 cm can cause a trip
- Ensure you use railings, travel restraints or fall protection systems where necessary

20.14.2 EATING AREAS

Workers must not keep or consume food in an area of a worksite where it could become unwholesome because of workplace contaminants.

Control Tech must ensure that there is an area suitable for the storage and consumption of food in each workplace.

A reasonable supply of potable drinking water shall be kept readily accessible at a project for the use of workers.

20.14.3 CHANGE AREAS

If Control Tech requires the worker to change into protective work clothing at the workplace, Control Tech must ensure that adequate change areas are provided

20.14.4 WASHROOM FACILITIES

Control Tech must ensure that a sufficient number of plumbed washrooms are readily available for workers. If plumbed washroom facilities cannot be provided because of the nature of the workplace or the nature of the work in which the worker is involved, Control Tech must provide access to portable washroom and hand-washing facilities.

If washroom facilities are provided they must be kept clean, sanitary and in proper working order and the proper supplies to maintain the washrooms must be available.

20.14.5 SMOKING

No worker is allowed to smoke in an enclosed place of employment, worksite or work-related area except in an area designated for smoking. Vehicles are considered a worksite so smoking in company vehicles is not allowed.

Smoking is allowed in designated smoking areas only. Exterior smoking areas must be a minimum of 3 metres from a doorway, window or air intake of an indoor workplace.

20.14.6 VENTILATION

Outdoor air must be effectively distributed throughout the workplace. Outdoor air intakes must be located so that air entering the ventilation system does not contain any contaminant in a concentration greater than normal outdoor air in that locality. A ventilation system must not be obstructed by material or equipment placed in front of the air intakes or discharge points.

20.14.7 LIGHTING

Light in the workplace must be adequate for the space and for jobs to be completed in a healthy and safe manner.

Emergency lighting

If failure of a lighting system would create conditions dangerous to the health and safety of workers, an emergency lighting system must be provided for the workplace and the exit routes.

An emergency lighting system must provide dependable illumination while the primary lighting system is off to enable emergency shutdown procedures, and evacuation of workers from the premises.

An emergency lighting system in a fixed facility must meet the requirements of the provincial Building Code.

21.0 GROUND DISTURBANCE

21.1 PURPOSE

The purpose of this program is to provide employees general information for working on owner client or other non-owned worksites. For excavation safety procedures the Control Tech Excavation safety procedure shall be followed. The material in this document does not take precedence over applicable government legislation which all employees must follow.

21.2 SCOPE

This program is to be followed by all employees who work in or around jobs involving ground disturbance. When work is performed on a site controlled by a prime contractor, the prime contractor's program shall take precedence. This document covers Control Tech workers and contractors and shall be used on owned premises, or worksites controlled by Control Tech or when a prime contractor's program doesn't exist or is less stringent.

21.3 RESPONSIBILITIES

Managers and Supervisors

- Control Tech must develop and implement safe work procedures for the work to be done at an excavation
- including the installation, use and removal of shoring
- Before any excavation work begins workers must be made aware of the potential hazards of the job functions they are to perform
- Only trained personnel can be involved in working in trenches or excavations

Employees

- Follow all safe work practices and procedures
- Attend training and follow all known safety requirements related to ground disturbance.
- To refuse unsafe work
- Report an unsafe condition.
- Employees must use and or wear protective equipment, devices and clothing as required for the hazards of the work.
- It is every employee's responsibility to ask questions about anything they do not understand or safe work procedures that are not clear.
- Workers must sign-off the site preparation form under the communication section prior to the commencement of the work.

21.4 DEFINITION & DUTIES OF COMPETENT PERSON

21.4.1 DEFINITION

A "Competent person" means a person who:

- Is qualified because of knowledge, training and experience to organize the work being completed and has a solid understanding of the tasks associated with the job and the hazards that are associated with those job tasks.
- Is familiar with this Act and the regulations that apply to the work
- Knows the hazards existing and likely to exist
- Knows how to control or eliminate the hazards

- Has been designated by the company as being competent
- Has been given the authority to promptly correct hazards and does so immediately upon becoming aware of them.

Only competent persons may conduct ground disturbance activities. Personnel involved in ground disturbance activities should be deemed as competent to complete those activities.

Control Tech will designate a competent person to supervise work at an excavation site.

The supervisor must be present at the site whenever a worker is in the excavation or work on the excavation is being performed.

The designated person must be capable of identifying existing or predictable hazards in surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and has authorization to take prompt corrective measures to eliminate them.

When applied to trenching or excavation operations, the Competent Person must have specific training in, and be knowledgeable about, soil analysis, the use of protective systems, and requirements of the standards.

Control Tech provides the competent person with the authority to take prompt corrective actions and that other management figures will support and stand by the competent person's decisions.

21.4.2 CRITERIA THE COMPANY IS REQUIRED TO USE TO DETERMINE THE SELECTION OF A COMPETENT PERSON.

- The employee shall demonstrate sufficient knowledge and practical experience to be able to identify existing and predictable hazards.
- The employee may be asked to demonstrate knowledge through questioning, tests or field exercises.
- The company shall pursue this demonstration until satisfied. In selecting a competent person the supervisor shall ask themselves, "would you trust your life on this person's ability to make sound decisions?
- Has the employee previously demonstrated sound judgment, do they make sound decisions?
- The competent person shall be identified in writing

21.4.3 DUTIES

- When a competent person is required, they will be named on the Job Hazard Analysis form which is to be completed each day.
- Perform Inspections as described below
- Testing for hazardous atmospheres when such atmospheres exist or are reasonably likely to exist
- Monitoring of water removal equipment and operations
- Visual and manual tests of soils to determine type
- When an employee is asked to perform the duties of a competent person they must thoroughly understand the regulations and the requirements of the associated regulation and make sound judgment decisions and be capable to support their decisions to both fellow employees and management.

<u>Protective Systems or Equipment</u>

- Competent Person must be on every job site when workers are exposed in a trench or excavation.
- Monitor water removal equipment and operations.
- Determine cave-in potential to assess need for shoring or other protective system.
- Examine damaged material or equipment used for protective systems to determine its suitability for continued use.
- Classify soil and rock deposits, by both visual analysis and by testing, to determine appropriate protection; re-classifying, if necessary, based on changing conditions.

- Determine the appropriate slope of an excavation to prevent collapse due to surcharge loads from stored material or equipment, operating equipment, adjacent structures, or traffic, and assuring that such slope is achieved.

21.4.4 DAILY INSPECTION

The competent person shall conduct daily inspections of excavations, adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions.

Where the competent person finds evidence of a situation that could result in a possible cave-in, failure of protective systems, hazardous atmosphere, or other hazardous conditions, exposed employees shall be removed from the hazardous area until precautions have been taken to assure their safety.

An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after heavy rains or other hazard increasing occurrence. These inspections are only required when the trench will be or is occupied by employees. Inspect to determine need for diversion ditches, dikes, or other suitable protection.

The competent person shall conduct inspections of material or equipment, if damaged, to determine if usable

Inspectors should look out for:

- Any change in the size of the excavation;
- Any changes to the sides of the excavation
- Any change in the water level, water egress
- Seepage from the sides
- Any movement of shoring, backfilled materials (i.e. rip rap)
- Change in the excavation footing

There shall be a written log of all inspections conducted. This log shall include the date, work site location, results of the inspection, and a summary of any action taken to correct existing hazards.

The pipe/buried facility owner is to be notified prior to backfilling operations. When a pipe/buried facility is exposed, the owner must be notified at least 24 hours prior to backfilling. The owner must inspect the buried facility to ensure its condition is satisfactory. If the owner cannot be contacted or fails to inspect, the ground disturber must demonstrate that they made an effort. All records of inspections shall be kept for the life of the buried facility.

21.4.5 PROTECTIVE SYSTEMS OR EQUIPMENT

- Monitoring water removal equipment and operations.
- Inspecting excavations subject to runoff from heavy rains to determine need for diversion ditches, dikes, or other suitable protection.
- Determining cave-in potential to assess need for shoring or other protective system.
- Examining damaged material or equipment used for protective systems to determine its suitability for continued use.
- Classifying soil and rock deposits, by both visual analysis and by testing, to determine appropriate protection; re-classifying, if necessary, based on changing conditions.
- Determining the appropriate slope of an excavation to prevent collapse due to surcharge loads from stored material or equipment, operating equipment, adjacent structures, or traffic, and assuring that such slope is achieved.

Backfilling

The pipe/buried facility owner is to be notified prior to backfilling operations. When a pipe/buried facility is exposed, the owner must be notified at least 24 hours prior to backfilling. The owner must inspect the buried facility to ensure its condition is satisfactory. If the owner cannot be contacted or fails to inspect, the ground disturber must demonstrate that they made an effort. All records of inspections shall be kept for the life of the buried facility.

Permit

A safe work permit must be completed prior to ground disturbance activity. A work permit will be completed prior to commencing a ground disturbance to ensure that all pre-job activities are complete and the crossing agreements or approvals are complete. The permit will include the requirements listed in the crossing agreements/approvals, identification of hazards and controls, and evidence of communication to affected personnel. The permit will be supplied by the owner client.

Exposure to Vehicular Traffic

Employees exposed to vehicular traffic shall be provided with, and shall wear warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Warning vests worn by flagmen shall be red or orange, and shall be of reflectorized material if worn during night work.

Exposure to Falling Loads

No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

21.4.6 HAZARDOUS ATMOSPHERES

The atmosphere in excavations shall be tested if a hazardous atmosphere exists or could reasonably be expected to exist. A hazardous atmosphere could be expected, for example, in excavations in landfill areas, in excavations in areas where hazardous substances are stored nearby, or in excavations near or containing gas pipelines.

The atmosphere in excavations over 4 feet deep shall be tested if a hazardous atmosphere exists or could reasonably be expected to exist. A hazardous atmosphere could be expected, for example, in excavations in landfill areas, in excavations in areas where hazardous substances are stored nearby, or in excavations near or containing gas pipelines.

Adequate precautions must be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or forced ventilation of the workspace.

Forced ventilation or other effective means must be used to prevent employee exposure to an atmosphere containing a flammable gas in excess of 10 percent of the lower flammability limit of the gas.

When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, continuous air monitoring will be performed. The device used for atmospheric monitoring must be equipped with an audible and visual alarm.

Atmospheric testing will be performed using a properly calibrated direct reading gas monitor. Direct reading gas detector tubes or other acceptable means may also be used to test potentially toxic atmospheres.

21.4.7 PERSONAL PROTECTIVE EQUIPMENT

All employees working in trenches or excavations shall wear approved hard-hats and steel toed shoes or boots.

Employees exposed to flying fragments, dust, or other materials produced by drilling, sawing, sanding, grinding and similar operations shall wear approved safety glasses with side shields.

Employees exposed to hazards produced by, or performing, welding, cutting, or brazing operations shall wear approved spectacles or a welding face shield or helmet.

Employees entering bell-bottom pier holes or other similar deep and confined footing excavations shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

Employees shall wear approved gloves or other suitable hand protection.

Employees using, or working in the immediate vicinity of, hammer drills, masonry saws, jackhammers or similar high noise producing equipment shall wear suitable hearing protection.

Each employee at the edge of an excavation 6 feet or more deep shall be protected from falling. Fall protection shall be provided by guardrail systems, fences or barricades.

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, and a basket stretcher shall be readily available where hazardous atmospheric conditions exist or may develop during work in an excavation. This equipment shall be attended when in use. Only personnel that have received approved training and have appropriate equipment shall attempt retrieval that would require entry into a hazardous atmosphere.

21.4.8 PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

Water must not be allowed to accumulate in an excavation if it might affect the stability of the excavation or might endanger workers. Erosion of slopes by surface water must be prevented if workers may be endangered.

Effective means shall be provided to prevent the accumulation of water in excavations.

If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operation shall be monitored by a competent person trained in the use of the equipment.

If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation. Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation.

The competent person shall inform workers of the precautions or procedures that are to be followed if water accumulates or is accumulating in an excavation.

21.4.9 PROTECTION OF EMPLOYEES FROM FALLING OBJECTS AND LOOSE ROCKS OR SOIL

Where work is being carried on in excavations, the slopes shall be scaled and trimmed, or otherwise stabilized to prevent slides of material or falls of rock and means shall be provided to prevent the dangerous erosion of slopes by surface water. Trees, utility poles, rocks or similar objects adjacent to an area to be excavated must be removed or secured if they could endanger workers.

Control Tech will utilize a higher level of compliance of 1.2 metre excavation depth for the following requirements:

- A worker shall not be permitted or required to enter an excavation over 1.2 metres in depth unless the sides of the excavation are sloped to safe angle, the sides have been secured by the use of sheet piling, shoring and bracing, or the workers are protected by other effective means.
- Before a worker begins working in an excavation that is more than 1.2 metres deep and closer to the wall or bank than the depth of the excavation Control Tech will ensure that the worker is protected from cave-ins or sliding or rolling materials by cutting back the walls of the excavation to reduce the height of the remaining vertical walls, if any, to no more than 1.5 metres for "hard and compact soil" and "likely to crack or crumble soil" installing temporary protective structures, or using a combination of the methods.

If the walls of an excavation are cut back Control Tech will ensure that if the soil is classified as "hard and compact soil", the walls are sloped to within 1.5 metres of the bottom of the excavation at an angle of not less than 30 degrees measured from the vertical or if the soil is classified as "likely to crack or crumble soil" the walls are sloped to within 1.5 metres of the bottom of the excavation at an angle of not less than 45 degrees measured from the vertical, and if the soil is classified as "soft, sandy or loose soil" the walls are sloped from the bottom of the excavation at an angle of not less than 45 degrees measured from the vertical.

Where a wall of an excavation or trench is cut back Control Tech shall ensure that in the case of type 1 or 2 soil, the walls are sloped to within 1.2 metres of the bottom of the excavation or trench, with a slope at an angle not steeper than one horizontal to one vertical, or 45 degree measured from the horizontal. In the case of type 3 soil, the walls are sloped from the bottom of the excavation, or trench, with a slope at an angle not steeper than one horizontal to one vertical, or 45 degrees measured from the horizontal. In the case of type 4 soils, the walls are sloped from the bottom of the excavation or trench, with a slope at an angle not steeper than three horizontal to one vertical or 19 degrees measured from the horizontal.

Excavated materials must be piled a minimum of 1.2 meters away from the edge of an excavation. Excavated material must be kept back a minimum distance of 0.6 m.(2 feet) from the edge of a trench excavation and 1.22 m (4 feet) from any other excavation. Excavated material must not be piled so it endangers workers. Excavated material shall be piled so that it cannot fall into the excavation.

Materials piled, grouped or stacked near the edge of an excavation must be stable and self-supporting. Spoil piles will be piled so that the leading edge of the pile is at least 1 metre away from the edge of the excavation, the slope of a spoil pile adjacent to the excavation is at an angle of not more than 45 degrees from the horizontal and loose materials are scaled and trimmed from the spoil pile.

21.5 EMPLOYEE EXPOSURE TO OVERHEAD POWER LINES

Where an excavation or trench is to be made in the vicinity of an overhead power line, Control Tech will ensure that the work is carried out in a manner that will not reduce the original support provided for any overhead power line pole unless permission has previously been obtained from the utility provider responsible for the overhead power line.

21.5.1 EQUIPMENT & OVERHEAD POWERLINES

Safe work practices for working within one metre of energized underground conductors are documented and all workers involved understand them. Instructions (both oral and written) should be provided by a competent person for new workers or for those who do not perform the work on a regular basis.

All equipment and machinery must maintain a safe distance from overhead hazards. The "Limits of Approach" as outlined in the WCB OSHR Section 19.23. Table 19-1 must be adhered to when working in close proximity to power lines.

General limits of approach

VOLTAGE PHASE TO PHASE	MINIMUM DISTANCE	
	METERS	FEET
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20

Boom Movements and maintaining Safe Limits from Powerlines

Boom movement must be monitored to ensure that the safe distances are maintained. It is the responsibility of all those involved with hydrovac operations to communicate with one another when any boom movement is required in the vicinity of overhead powerlines. This includes during initial set-up or to reposition the boom.

Induction Hazards

Energized electrical conductors generate electrostatic and electromagnetic fields. As a result, working under some high-voltage lines can cause vehicles and metal objects to become electrically energized to a voltage greater than ground/earth. Review this hazard during the job planning process and establish a means to control induction. This could be by using bonding techniques or combining bonding with a method of draining the induced voltage by using a connection to an effective ground.

Blockages or Removing the Dig Tube

Periodically, rocks or other pieces of debris can become lodged in the dig tube and need to be removed to allow for a proper vacuum. Take special care if the dig tube needs to be elevated for removal of the blockage. Remove sections of the dig tube if required, but in all cases, have the signaler observe the boom movement, giving consideration to safe limits of approach.

This same consideration needs to be taken when removing the dig tube from the excavation, especially when additional sections have been added because of the depth.

Boom Position when Setting Up or Moving the Truck

Take special care to ensure that the boom has been properly stored in the cradle. The boom may not need to be stored when moving the truck very short distances or removing the boom from the cradle prior to getting the truck into a working position. Take all necessary precautions such as inspecting the surrounding area prior to moving the truck and positioning the boom so that its height is equal to or lower than it would be if it was in the stored position.

Communication between the person moving the truck and the signaler must be established and the signaler needs to be in the best position possible to monitor the truck and boom while maintain visual contact with the driver.

21.6 MARKING UNDERGROUND UTILITIES

Buried facilities must be located and marked before the ground is disturbed. Before excavating or drilling with powered tools and equipment, the location of all underground utility services in the area must be accurately determined and any danger to workers from the services must be controlled.

Call Alberta One Call to:

- Tell you which members may have underground facilities in the proposed excavation area
- Transmit the information about the proposed activity to the member companies
- Inform you about your liability and provide you with a ticket number to confirm your request

- Advise you to contact any other parties who may have underground facilities in the excavation area, as all facility owners are not members of ALBERTA ONE CALL. You must contact these non-members directly.

Buried facilities must be exposed by hand digging or other non-destructive techniques within the hand expose zones. Control Tech must ensure that work with mechanical excavation equipment is not permitted within the hand expose zone of a buried facility until the buried facility has been exposed to sight by hand digging, by a non-destructive technique acceptable to the owner of the buried facility or by an equivalent method.

Pointed tools must not be used to probe for underground gas and electrical services. Powered equipment used for excavating must be operated so as to avoid damage to underground utility services, or danger to workers.

Each member company will then contact you with information about where their facilities are buried in the proposed excavation area. **Always wait for a response from all facility owners** in the proposed excavation site before digging. Give the utility a minimum of **three full working days'** notice for planned work.

All underground utilities will be double checked during the initial locating, scoping and marking. Due to the time that can elapse from the initial locating, and marking of utilities to the job start date, the utilities within the daily construction and excavation limits will also be checked daily before the start of any construction.

The thickness of the markings should be 0.5 m. – 0.6 m. (18"-24") in length and 50 mm. (2") in width. The utility should be indicated by initials or by name in letters (150 mm. (6") high on the locate marking. On long locates the facility owner should be indicated every 100'.

If the surface over the buried line is to be removed, supplemental offset markings may be used. Offset markings should be on a uniform alignment and must clearly indicate that the actual facility is a specific distance away.

UNIFORM COLOR CODE FOR MARKING UNDERGROUND UTILITY LINES

WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Petroleum, Steam, or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

Approvals shall be received from buried facility owners prior to ground disturbance activity. Before the start of a ground disturbance activity approvals or crossing agreements must be obtained from the buried facility owner. The approval will outline the personnel responsibilities as well as any conditions or limitations for the ground disturbance activity.

Control Tech, as Ground Disturber, shall confirm that notification of the buried facility owner is complete prior to a ground disturbance activity. Before starting a ground disturbance activity, notification should be made to the Provincial One-Call centre/buried facility owner for the applicable province. The One-Call centre will notify the subscribed buried facility owners of the pending ground disturbance.

Control Tech must ensure that the initiator has accurately established the location of all underground pipelines, cables and conduits in an area where worker is to be done and shall ensure that those locations are conspicuously marked before commencing work using power tools or powered mobile equipment on an

excavation, trench, tunnel, excavated shaft or borehole or before breaking ground surface with any equipment to a depth that may contact underground utilities.

Emergency response procedures are to be implemented in the event buried facilities are damaged. When unwanted contact is made with a pipe or buried facility, work should be stopped immediately and the owner (licensee) will be notified. If the owner cannot be contacted, the applicable one-call centre will be contacted.

Utilities left in place shall be protected by barricades, shoring, suspension or other means as necessary to protect employees.

Where there is contact with or damage to an underground pipeline, cable or conduit Control Tech shall **immediately notify the owner** of the pipeline, cable or conduit that contact or damage has occurred and take steps to protect the health and safety of any worker who may be at risk until any unsafe condition resilient from the contact or damage is repaired or corrected.

21.7 ACCIDENTAL CONTACT PROCEDURES

21.7.1 UTILITIES

The purpose of this safety procedure is to:

- Prevent injuries to workers resulting from accidental contact with underground utilities
- Prevent economic loss resulting from accidental contact with underground utilities
- Provide the appropriate response to accidental contact with underground utilities

21.7.2 ACCIDENTAL CONTACT WITH A GAS UTILITY

If gas line has been struck, jarred, or pulled, or if the wrapping or surface of a pipe has been damaged:

1. Stop work immediately in the area around the damaged gas line.
2. Turn off vehicles, machinery and eliminate all sources of ignition.
3. Check for the smell or sound of escaping gas in the area. If gas is detected, proceed to the steps outlined in the next section.
4. Notify:
    - Gas Company 24 hour emergency line
    - Project Manager/Safety Manager
    - Customer Emergency Contact Person
5. If safe to do so, cordon area off with vehicles, barricades, tape, etc.
6. Do not backfill! Gas Company must physically check the integrity of the piping system and repair the damage.
7. Work must not resume at the damaged gas line location until Gas Company has confirmed that the site is safe for the intended work. Only the project supervisor can authorize the crew to resume work in the excavation.
8. Control Tech safety manager or Control Tech designated person must conduct an accident/incident investigation and submit a damage to utility report to Occupational Health and Safety in Human Resources.

Gas is escaping from a ruptured line:

1. Stop work immediately and shut down the project.
2. Turn off vehicles, machinery and eliminate all sources of ignition.
3. Evacuate the area – move people upwind if possible – and prevent cars and bystanders from entering.
4. Call gas company's 24 hour emergency line and request company representative attend the scene.

5. Notify:
    - Emergency: 911
    - Fire-Rescue Dispatch
    - Gas Company 24 hour emergency line
    - Project Manager/Safety Manager
    - Customer Emergency Contact Person
6. If safe to do so, cordon area off with vehicles, barricades, tape, etc.
7. Do not attempt to make temporary repairs or operate any underground gas valves.
8. Work must not resume until Gas Company has confirmed that the site is safe for the intended work. Only the project supervisor can authorize the crew to resume work in the excavation. If safe to do so, please take pictures of damaged utility.
9. Control Tech supervisors must complete an accident/incident investigation and submit a report to Occupational Health and Safety in Human Resources

Warnings:

Dead gas mains may contain residual natural concentrations in the explosive range for natural gas (5-15% methane in air).

Polyethylene gas lines generally have a static charge build-up, making it dangerous for unqualified workers to try to stop a gas leak in an excavation involving this type of pipe.

21.7.3 ACCIDENTAL CONTACT WITH A HYDRO ELECTRICAL UTILITY

If a cable is accidentally contacted, stop work immediately.

Treat all electrical components as if they are “live” – do not approach them. Do not take any steps. Ensure people keep people well back (stay 10 meters/33 feet away).

If you must move on energized ground, shuffle or hop away to a minimum distance of 10 meters/33 feet while keeping your feet together and touching each other never allowing the heel of one foot to go beyond the toe of the other.

Notify:

- Emergency: 911
- Fire-Rescue Dispatch
- 24 hour emergency line
- Project Manager/Safety Manager
- Customer Emergency Contact Person
- Occupational Health & Safety
- Move the digger bucket clear of the cable to break contact and stay out of the trench.

If the machine can’t be moved, keep workers 10 meters (33 feet) away and have the operator remain in the vehicle.

If the operator is in danger by remaining in the machine, i.e., an uncontrolled fire, vehicle rollover, the operator should jump off the machine keeping his feet together. Never contact the machine and the ground at the same time.

Once clear of the machine, shuffle or hop away to a minimum distance of 10 meters/33 feet while keeping your feet together and touching each other never allowing the heel of one foot to go beyond the toe of the other.

If safe to do so, cordon area off with vehicles, barricades, tape, etc.

Work must not resume until the power company has confirmed that the site is safe for the intended work.

Only Control Tech Safety Manager or project supervisor can authorize the crew to resume work in excavation.

Control Tech Supervisors must complete an accident/incident investigation and submit a report to Occupational Health and Safety in Human Resources.

Warnings:

If there is an electrical fire, do not use water to control it. Water conducts electricity.

SEVEN STEPS TO ELECTRICAL SAFETY		
Electricity is a part of our everyday lives and must be treated with respect. Everyone should know the 7 Steps to Electrical Safety. Learn them and pass them on. Remember, they don't call it power for nothing!		
1	10 Metres to Safety	Stay back at least 10 metres (33 feet) from any fallen power line or exposed underground cable.
2	Look up and live	Look up, check and keep equipment clear of overhead power lines.
3	Know your limits	When using equipment in the vicinity of power lines, always maintain the limits of approach: from 3-7 metres (10-20 feet) depending on the voltage.
4	Don't hang around operating equipment	Stay at least 10 metres (33 feet) from operating equipment, in case it contacts an energized line.
5	Shuffle or hop - Don't Step	If your vehicle makes contact with an energized line remain inside until help arrives. If you must get out due to fire, jump out with your feet together. Then shuffle away, keeping both feet close together. Never contact the ground and your vehicle at the same time.
6	Call before you dig	To avoid contacting underground power lines, before you dig, call Alberta 1st call at: 1.800.242.3447. #ClickBeforeYouDig 24/7 at https://t.co/6CM8vBz0lD http://albertaonecall.com/
7	Don't become a victim	Always call local emergency personnel when someone is injured in an electrical accident.

21.8 SAFE ACCESS AND MEANS OF EGRESS

Safe means of entry and exit must be provided for an excavation a worker enters. If workers are required to enter a trench over 1.2 m (4 ft.) deep, the safe point of entry and exit must be located within 8 m (25 ft.) of the workers and the excavation must be safely supported or sloped to the entry and exit location.

A safe means of access and egress such as ladders, ramps, stairs, etc. are provided for workers entering and exiting an excavation. If a worker is required or permitted to enter an excavation, tunnel or underground shaft Control Tech must provide the worker with a safe means of entering and leaving the area prior to work beginning. This will include the requirement to install ladders, stairways or ramps to provide a safe means of entrance to and exit from the trench and to ensure that the ladder, stairway or ramp is located not more than eight meters from a worker working in the trench.

21.8.1 LADDERS

When workers are required to enter excavations over 1.2 metres in depth a ladder shall be provided in the immediate area where workers are employed and the ladder shall extend from the bottom of the excavation to at least 0.91 metres above the top of the excavation.

- Ladders shall be used only on stable and level surfaces unless secured. Ladders placed in any location where they can be displaced by workplace activities or traffic shall be secured, or barricades shall be used to keep these activities away from the ladder.
- Non-self-supporting ladders shall be positioned so that the foot of the ladder is one-quarter of the working length away from the support.
- Employees shall not be allowed to carry any object or load while on the ladder that could cause them to lose their balance and fall.

21.8.2 STRUCTURAL RAMPS

Structural ramps used solely by employees as a means of access or egress from excavations shall be designed by a competent person.

Structural ramps used for access or egress of equipment shall be designed by a person qualified in structural design, and shall be constructed in accordance with the design.

Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent movement or displacement.

Structural members used for ramps and runways shall be of uniform thickness.

Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

Structural ramps used in place of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

21.8.3 BARRIERS, MARKING AND GUARDING OF EXCAVATIONS

Barriers are set up around excavations and trenches to protect employees. If an excavation is a hazard to workers, it must be effectively covered or guarded.

If there is a danger of a worker or equipment falling into an excavation Control Tech will ensure that workers are made aware of the excavation through flagging, marking, safeguards, or other appropriate and effective means.

Guardrails, fences, or barricades shall be provided on excavations adjacent to walkways, driveways and other pedestrian or vehicle thoroughfares. Warning lights or other illumination shall be maintained as necessary for the safety of the public and employees from sunset to sunrise.

Walkways or bridges protected by standard guardrails shall be provided where employees and the general public are permitted to cross over excavations. Where workers in the excavation may pass under these walkways or bridges, a standard guardrail and toe board shall be used.

21.9 SLOPING AND SHORING REQUIREMENTS

Workers may not enter an excavation unless the sides are adequately sloped and secured via shoring, bracing, or other means. Before a worker enters any excavation over 1.2 m (4 ft.) in depth or, while in the excavation, approaches closer to the side or bank than a distance equal to the depth of the excavation, the excavation sides must be sloped or supported as specified by a professional engineer or geoscientist, or the sides of the excavation must be:

- Sloped as specified in writing by a qualified registered professional
- Sloped at angles, dependent on soil conditions, which will ensure stable faces
- Benched - bench width shall not be less than 1.5 times the height of its rise below
- Supported as specified in writing by a professional engineer

- Supported by manufactured or prefabricated trench boxes or shoring cages, or other effective means.
- Sloped to safe angle - no slope can be steeper than 0.9 m (3 ft.) Horizontal to 1.22 m (4ft) vertical (see appendix
- Supported in accordance with the minimum requirements of the regulation, or
- Supported by manufactured or prefabricated trench boxes or shoring cages, or other effective means.

If the end of a trench over 1.2 m (4 ft.) in depth is not adequately sloped, end shoring must be installed unless:

- a worker in the trench is not required to approach closer to the end of the trench than a distance equal to the depth of the trench at that end
- where, for the prevailing soil conditions at the end of the trench, the permissible spacing of uprights equals or exceeds the width of the trench, or
- otherwise authorized in writing by a professional engineer or professional geoscientist

If end shoring is required, the walers for the end shoring must be installed to bear against the walers that extend along the sides of the trench, or in a manner that will provide equivalent structural restraint. End shoring must be designed by a professional engineer if the end shoring waler length exceeds 1.8 m (6 ft.).

Shoring must extend from at least 30 cm (1 ft.) above ground level to as close to the bottom of the trench as the material being installed will allow, but in no case more than 60 cm (2 ft.) from the bottom.

Shoring need not extend above ground level where traffic crossing plates need to be used, provided that other measures are taken to prevent excavated or other material from entering the excavation.

A safety spotter must be designated to each excavation while a worker is in the excavation to identify any potential hazard that may occur while the work is being performed. Equipment Operators and Truck Drivers may be designated as spotters, they must remain in a position while designated as the spotter to observe and communicate at all times with the excavation worker.

Excavation support systems must be installed so that they are firmly in contact with the face of the excavation. This can be achieved by back filling or blocking. Any engineered excavation support system must have certified design documentation available on site. It must also be inspected daily and maintained in a fully effective condition.

Shoring is installed from the top down and removed in the reverse order.

- Workers are not allowed in an unsupported trench to compact backfill.
- Workers must not enter an excavation to remove shoring materials if ground conditions have deteriorated so as to make entry for shoring removal unsafe.

When a combination of sloping and shoring is used the minimum amount of shoring must be equivalent to the standard for the overall depth of the excavation.

When used, installation and removal of shoring must be done according to work jurisdictions' OHS Regulations. The work procedures for installation or removal of shoring must ensure that workers are not exposed to undo risk. In general, shoring must be installed from the top down and removed in reverse order.

21.10 STABILITY

21.10.1 STABILITY OF ADJACENT STRUCTURES

Adjacent structures that might be affected by ground disturbance activities are adequately supported before work begins. The competent person will determine if the excavation work could affect the stability of adjoining buildings, walls, sidewalks or other structures. Before excavating or trenching begins, where the stability of a structure may be affected by an excavation trench, the structure will be supported by a

temporary protective structure designed by a professional engineer and constructed, installed, used, maintained and dismantled in accordance with that design.

Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted.

Trees, utility poles, rocks and similar objects adjacent to an area to be excavated must be removed or secured if they could endanger workers.

21.10.2 STABILITY OF SOIL

Control Tech must stabilize the soil in an excavation by shoring or cutting back or in a tunnel, underground shaft or open pit mine by shoring.

21.10.3 PROTECTION OF EMPLOYEES FROM FALLING OBJECTS AND LOOSE ROCKS OR SOIL

Where work is being carried on in excavations, the slopes shall be scaled and trimmed, or otherwise stabilized to prevent slides of material or falls of rock, overhanging banks and dangerous trees or stumps which could endanger workers shall be removed and means shall be provided to prevent the dangerous erosion of slopes by surface water.

Note: Control Tech will utilize a higher level of compliance of 1.2 meter excavation depth for the following requirements:

A worker shall not be permitted or required to enter an excavation over 1.2 metres in depth unless the sides of the excavation are sloped to safe angle, the sides have been secured by the use of sheet piling, shoring and bracing, or the workers are protected by other effective means.

Before a worker begins working in an excavation that is more than 1.2 metres deep and closer to the wall or bank than the depth of the excavation Control Tech will ensure that the worker is protected from cave-ins or sliding or rolling materials by cutting back the walls of the excavation to reduce the height of the remaining vertical walls, if any, to no more than 1.5 metres for “hard and compact soil” and “**likely to crack or crumble soil**” installing temporary protective structures, or using a combination of the methods.

- If the walls of an excavation are cut back Control Tech must ensure that, if the soil is classified as “hard and compact soil”,
- the walls are sloped to within 1.5 metres of the bottom of the excavation at an angle of not less than 30 degrees measured from the vertical or
- if the soil is classified as “likely to crack or crumble soil” the walls are sloped to within 1.5 metres of the bottom of the excavation at an angle of not less than 45 degrees measured from the vertical, and
- if the soil is classified as “soft, sandy or loose soil” the walls are sloped from the bottom of the excavation at an angle of not less than 45 degrees measured from the vertical

Where a wall of an excavation or trench is cut back Control Tech shall ensure that in the case of **type 1 or 2 soil**

- the walls are sloped to within 1.2 meters of the bottom of the excavation or trench, with a slope at an angle not steeper than one horizontal to one vertical, or
- 45 degree measured from the horizontal.

In the case of **type 3 soil**, the walls are sloped from the bottom of the excavation, or trench, with a slope at an angle not steeper than one horizontal to one vertical, or 45 degrees measured from the horizontal.

In the case of type **4 soils**, the walls are sloped from the bottom of the excavation or trench, with a slope at an angle not steeper than three horizontal to one vertical or 19 degrees measured from the horizontal.

Workers shall not allow excavated material, equipment, rocks and construction materials to remain within 1.22 metres of the edge of a trench-type excavation nor within 1.50 metres from the edge of a pit-type excavation from any other excavation. Under no circumstances may excavated material be piled so that it endangers workers. Excavated material shall be piled so that it cannot fall into the excavation.

Materials piled, grouped or stacked near the edge of an excavation must be stable and self-supporting. Spoil piles will be piled so that the leading edge of the pile is at least 1 metre away from the edge of the excavation, the slope of a spoil pile adjacent to the excavation is at an angle of not more than 45 degrees from the horizontal and loose materials are scaled and trimmed from the spoil pile.

21.11 TRAINING

All personnel involved in trenching or excavation work shall be trained in safe work practices, the requirements of this program, the Control Tech Excavation program and applicable regulatory requirements. Workers shall ensure workers are made aware of the potential hazards of the job functions they are to perform.

21.12 PROGRAM REVIEW

The Ground Disturbance program shall be reviewed as necessary. The ground disturbance written program must be reviewed on a regular basis and updated as necessary. The program will be reviewed when there are changes to regulations, client or Control Tech policy.

22.0 HAND AND POWER TOOLS

22.1 PURPOSE

The purpose of this program is to provide establish requirements for the safe operation of hand and power tools and other portable tools, including proper guarding. All hand and power tools shall be maintained in a safe condition. The material in this document does not take precedence over applicable government legislation which all employees must follow.

22.2 SCOPE

This program applies to all Control Tech employees who use hand and power tools while engaged in work at Control Tech facilities and/or facilities operated by others.

22.3 RESPONSIBILITIES

Managers/Supervisors

- Ensure that all employees using portable tools have been trained and fully understand the operations and maintenance procedures of such tools, including their proper use.
- Provide and train employees with all additional PPE that may be needed for the safe operation of portable tools.
- Ensure that each tool, machine and piece of equipment in the workplace is capable of safely performing the functions for which it is used, and selected, used and operated in accordance with
- the manufacturer's instructions, if available,
- safe work practices, and
- the requirements of the Regulation

Employees

- Shall ensure they have correct tool for each task.
- Shall follow manufactures safety and operating instructions before using

22.4 REQUIREMENTS

22.4.1 PERSONAL PROTECTIVE EQUIPMENT

Proper personal protective equipment (PPE) for using hand and/or power tools.

Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dust, fumes, mists, vapors or gases shall be provided with the particular PPE necessary to protect them from the hazard.

Ergonomic concerns are taken into consideration when selecting hand and/or power tools.

22.5 SAFE WORK PRACTICES FOR HAND AND POWER TOOLS

The installation, inspection, testing, repair and maintenance of a tool, machine or piece of equipment must be carried out in accordance with the manufacturer's instructions and any standard the tool, machine or piece of equipment is required to meet or as specified by a professional engineer.

- All tools, regardless of ownership, shall be of an approved type and maintained in good condition.

- Maintenance records are kept for power tools used, regardless of ownership. An effective written or other permanent recording system or log must be immediately available to the operator, and to any other person involved with inspection and maintenance of the tool.
- Tools are subject to inspection at any time.
- All employees have the authority and responsibility to condemn unsafe tools, regardless of ownership.
- Defective tools must be removed from service and identified in a manner which will ensure it is not inadvertently returned to service until it has been made safe for use.
- Unsafe tools shall be tagged with a DO NOT USE OR OPERATE tag to prevent their use.
- Any modification of a tool, machine or piece of equipment must be carried out in accordance with
- the manufacturer's instructions, if available
- safe work practices
- the requirements of OHS legislation
- Tools may only be used for the purposes for which they were designed. Hand and/or power tools shall be appropriate for the job for which they are intended and be used solely for the purposes for which they were designed.
- Employees shall always use the proper tool for the job to be performed. Makeshift and substitute tools shall not be used.
- Power tools may only be operated by competent persons who have been trained in their proper use.
- A person must not be authorized to operate a power tool until the person has been adequately instructed and trained, and has demonstrated an ability to safely operate it.
- Hammers with metal handles, screwdrivers with metal continuing through the handle, and metallic measuring tapes shall not be used on or near energized electrical circuit or equipment.
- Tools shall not be thrown from place to place or from person to person; tools that must be raised or lowered from one elevation to another shall be placed in tool bags/buckets firmly attached to hand lines.
- Tools shall never be placed unsecured on elevated places.
- Impact tools such as chisels, punches, and drift pins that become mushroomed or cracked shall be dressed, repaired, or replaced before further use.
- Chisels, drills, punches, ground rods, and pipes shall be held with suitable holders or tongs (not with the hands) while being struck by another employee.
- Shims shall not be used to make a wrench fit.
- Wrenches with sprung or damaged jaws shall not be used.
- Tools shall be used only for the purposes for which they have been approved.
- Tools with sharp edges shall be stored and handled so that they will not cause injury or damage. They shall not be carried in pockets unless suitable protectors are in use to protect the edge. They shall not be carried in pockets unless suitable protectors are in use to protect the edge.
- Wooden handles that are loose, cracked, or splintered shall be replaced. The handle shall not be taped or lashed with wire. The handle shall not be taped or lashed with wire.
- Tools shall not be left lying around where they may cause a person to trip or stumble.
- When working on or above open grating, a canvas or other suitable covering shall be used to cover the grating to prevent tools or parts from dropping to a lower level where others are present or the danger area shall be barricaded or guarded.
- The insulation on hand tools shall not be depended upon to protect users from high voltage shock (except approved live line tools).
- Control Tech must ensure that before the tool, machine or piece of equipment is used in the workplace the manual has been obtained, and the supplier has provided sufficient information to identify the standard or standards to which the tool, machine or equipment has been manufactured.

22.6 PORTABLE ELECTRIC TOOLS

- All portable electric tools used by employees shall meet the standards set out in CSA Standard CAN C22.2 No. 71.1-M89, Portable Electric Tools.
- All portable electric tools used by employees in a fire hazard area shall be marked as appropriate for use or designed for use in the area of that hazard.
- The non-current carrying metal parts of portable electric tools such as drills, saws, and grinders shall be effectively grounded when connected to a power source unless:
- The tool is an approved double-insulated type
- The tool is connected to the power supply by means of an isolating transformer or other isolated power supply.
- All powered tools shall be examined prior to use to ensure general serviceability and the presence of all applicable safety devices.
- Powered tools shall be used only within their design and shall be operated in accordance with manufacturer's instructions. The use of electric cords for hoisting or lowering tools shall not be permitted.
- All tools shall be kept in good repair and shall be disconnected from the power source while repairs or adjustments are being made.
- Electrical tools shall not be used where there is hazard of flammable vapors, gases, or dusts without a valid Hot Work Permit.
- Ground fault circuit interrupters or use of an Assured Grounding Program shall be used with portable electric tools. This does not apply to equipment run off of portable or truck mounted generators at 5KW or less, that are isolated from ground or to equipment ran directly off of secondary's.

22.7 PNEUMATIC TOOLS

- Pneumatic tools shall never be pointed at another person.
- Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
- A restraining device must be attached where an air hose is connected to a portable air-powered tool.
- Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
- Compressed air shall not be used for cleaning purposes, except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.
- Compressed air shall not be used to blow dust or dirt from clothing.
- The manufacturers stated safe operating pressure for hoses, pipes, valves, filters, and other fitting shall not be exceeded.
- The use of hoses for hoisting or lowering tools shall not be permitted.
- Before making adjustments or changing air tools, unless equipped with quick-change connectors, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled at the tool before breaking the connection.
- Compressed air tools, while under pressure, must not be left unattended.
- All connections to air tools shall be made secure before turning on air pressure.
- Air at the tool shall not be turned on until the tool is properly controlled.
- All couplings and clamps on pressurized air hose shall be bridged (pinned) with suitable fasteners.
- Hose and hose connections used for conducting compressed air to utilization equipment shall be designed for the pressure and service to which they are subjected.
- Use only approved end-fitting clamps (screw type heater hose clamps are not acceptable).
- While blowing down hose, do not point it toward people.
- Power tools are to be operated only by competent persons who have been trained in their proper use.
- Conductive hose should not be used near energized equipment.

- Foot protection shall be worn while operating paving breakers, tampers, rotary drills, clay spades, and similar impactor-type tools or at other times when instructed by supervision.
- All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 psi. Pressure at the tool shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.
- Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.
- In lieu of the above, a diffuser nut (which will prevent high pressure), high velocity release (while the nozzle tip is removed), plus a nozzle tip guard (which will prevent the tip from coming into contact with the operator), or other equivalent protection, shall be provided.

22.8 POWDER ACTUATED TOOLS (TOOLS ACTUATED BY AN EXPLOSIVE CHARGE)

- All explosive actuated fastening tools used by employees shall meet the standards set out in CSA Standard Z166-1975, Explosive Actuated Fastening Tools
- Only those employees who have been trained certified in their use shall operate these tools.
- Explosive charges shall be carried and transported in approved containers.
- Operators and assistants using these tools shall be protected by means of eye, face, and hearing protection.
- Tools shall be maintained in good condition and serviced regularly by qualified persons. The material upon which these tools are to be used shall be examined before work is started to determine its suitability and to eliminate the possibility of hazards to the operator and others.
- Prior to use, the operator shall ensure that the protective shield is properly attached to the tool.
- Before using a tool, the operator shall inspect it to determine to his satisfaction that it is clean, that all moving parts operate freely, all guards and safety devices are in place, and that the barrel is free from obstructions.
- Before using tools the operator shall read and become familiar with the manufacturers operating guidelines and procedures.
- When a tool develops a defect during use, the operator shall immediately cease to use it, until it is properly repaired in accordance with the manufactures specifications.
- Tools shall not be loaded until just prior to the intended firing time, nor shall an unattended tool be left loaded. Empty tools are to be pointed at any workmen.
- In case of a misfire, the operator shall hold the tool in the operating position for at least 30 seconds. He shall then try to operate the tool a second time. He shall wait another 30 seconds, holding the tool in the operating position; then he shall proceed to remove the explosive load in strict accordance with the manufacturer's instructions.
- A tool shall never be left unattended in a place where it would be available to unauthorized persons.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- Tools shall not be used in an explosive or flammable atmosphere.

22.9 HYDRAULIC POWER TOOLS

The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.

All hydraulic tools, which are used on or around energized lines or equipment, shall use non-conducting hoses having adequate strength for the normal operating pressures.

22.9.1 HYDRAULIC JACKS

Loading and Marking

- The operator shall make sure that the jack used has a rating sufficient to lift and sustain the load.
- The rated load shall be legibly and permanently marked in a prominent location on the jack by casting, stamping, or other suitable means.

Operation and Maintenance

- In the absence of a firm foundation, the base of the jack shall be blocked. If there is a possibility of slippage of the cap, a block shall be placed in between the cap and the load.
- The operator shall watch the stop indicator, which shall be kept clean, in order to determine the limit of travel. The indicated limit shall not be overrun.
- After the load has been raised, it shall be cribbed, blocked, or otherwise secured at once.
- Hydraulic jacks exposed to freezing temperatures shall be supplied with adequate antifreeze liquid.
- All jacks shall be properly lubricated at regular intervals.
- Each jack shall be thoroughly inspected before each use. Jacks, which are in unsafe condition, shall be tagged accordingly, and shall not be used until repairs are made.

22.9.2 ABRASIVE BLAST CLEANING NOZZLES

The blast cleaning nozzles shall be equipped with an operating valve, which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

22.10 FUEL POWERED TOOLS

All fuel-powered tools shall be stopped while being refueled, serviced, or maintained, and fuel shall be transported, handled, and stored in accordance with the Flammable and

When fuel powered tools are used in enclosed spaces, the applicable requirements for concentrations of toxic gases and use of personal protective equipment shall be adhered to.

22.11 GUARDING PORTABLE TOOLS

Guards shall be in place and operable at all times while the tool is in use. The guard may not be manipulated in such a way that will compromise its integrity or compromise the protection in which intended. Guarding shall meet the requirements set forth in provincial OHS legislation: Tools, Machinery & Equipment.

Portable Circular Saws

- All portable, power-driven circular saws having a blade diameter greater than 2 in. shall be equipped with guards above and below the base plate or shoe.
- The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts.
- The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work.
- When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to covering position.
- All cracked saw blades shall be removed from service.

Switches and Controls

- All hand held powered tools, circular saws, drills, tappers, fastener drivers, horizontal or vertical angle grinders, etc., shall be with a constant pressure switch or control, and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.
- All handheld powered circular saws having a blade diameter greater than 2 inches, electric, hydraulic or pneumatic chain saws, and percussion tools without positive accessory holding means shall be equipped with a constant pressure switch or control that will shut off the power when the pressure is released. All handheld gasoline powered chain saws shall be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.
- The operating control on handheld power tools shall be so located as to minimize the possibility of its accidental operation, if such accidental operation would constitute a hazard to employees.
- Grounding of portable electric powered tools shall meet the electrical requirements that can be found in the Electrical Safety Program. All electric power tools shall be equipped with a three-prong plug.

Portable Abrasive Wheels

Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dust, fumes, mists, vapors or gases shall be provided with the particular PPE necessary to protect them from the hazard.

Safety Guards Exceptions

- Wheels used for internal work while within the work being ground.
- Mounted wheels used in portable operations 2 inches and smaller in diameter.
- Types 16, 17, 18, 18R, and 19 cones, plugs, and threaded whole pot balls where the work offers protection.
- Guards shall be made of steel or other material with adequate strength.
- A safety guard shall cover the spindle end, nut and flange projections. The safety guard shall be mounted so as to maintain proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard.
- Exception: safety guards on all operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut and outer flange are exposed. Where the nature of the work is such as to entirely cover the side of the wheel, the side covers of the guard may be omitted.
- Exception: the spindle end, nut, and outer flange may be exposed on portable machines designed for, and used with, type 6, 11, 27, and 28 abrasive wheels, cutting off wheels, and tuck pointing wheels.

Mounting and Inspection of Abrasive Wheels

- Immediately before mounting, all wheels shall be closely inspected and a ring test performed, to make sure they have not been damaged in transit, storage, or otherwise.
- Ring test – “tap” wheels about 45 degrees each side of the vertical centerline and about 1 or 2 inches from the periphery; then rotate the wheel 45 degrees and repeat the test; a sound and undamaged wheel will give a clear metallic tone If cracked, there will be a dead sound and not a clear “ring.”
- The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.
- Grinding wheels shall fit freely on the spindle and remain free under all grinding conditions.
- A controlled clearance between the wheel hole and the machine spindle (or wheel sleeves or adaptors) is essential to avoid excessive pressure from mounting and spindle expansion.
- The machine spindle shall be made to nominal (standard) size plus zero minus.002 inch, and the wheel hole shall be made suitably oversize to assure safety clearance under the conditions of operating heat and pressure.

- All contact surfaces of wheels, blotters, and flanges shall be flat and free of foreign matter.
- When a bushing is used in the wheel hole it shall not exceed the width of the wheel and shall not contact the flanges.

Portable Grinders

Special "revolving cup guards" which mount behind the wheel and turn with it shall be used. They shall be made of steel or other material with adequate strength and shall enclose the wheel sides upward from the back for one-third of the wheel thickness. It is necessary to maintain clearance between the wheel side and the guard. The clearance shall not exceed one-sixteenth inch.

Vertical portable grinders, also known as right angle grinders, shall have a maximum exposure angle of 180 degrees and the guard shall be located between the operator and the wheel during use. Adjustment of the guard shall ensure that pieces of an accidentally broken wheel will be deflected away from the operator.

The maximum angular exposure of the grinding wheel periphery and sides for safety guards used on other portable grinding machines shall not exceed 180 degrees and the top half of the wheel shall be enclosed at all times.

23.0 HOT WORK – WELDING/CUTTING/GRINDING

23.1 PURPOSE

The purpose of this program is to develop and implement safe work procedures respecting hot work processes performed in the workplace. The material in this document does not take precedence over applicable government legislation which all employees must follow.

23.2 SCOPE

This program is applicable to all employees directly involved or assisting in the welding, cutting and hot work operation. When work is performed on a site controlled by a prime contractor, the prime contractor's program shall take precedence and shall be abided by. This document covers Control Tech employees and contractors on company owned/leased premises or on site where Control Tech is the prime contractor.

23.3 DEFINITIONS

Welding/Hot Work Procedures – is any activity which results in sparks, fire, molten slag, or hot material which has the potential to cause fires or explosions.

Examples of Hot Work - Cutting, Brazing, Soldering, Thawing Pipes, Grinding, using an electric tool in a hazardous area and Welding.

Special Hazard Occupancies - any area containing Flammable Liquids, Dust Accumulation, Gases, Plastics, Rubber and Paper Products.

Hazards - includes, but not limited to the following; fires and explosions, skin burns, welding "blindness", and respiratory hazards from fumes and smoke.

23.4 RESPONSIBILITIES

Managers and Supervisors

- Determine if its property is safe for welding and cutting operations.
- Establish safe areas for welding and cutting operations.
- Provide training for all employees whose task includes heat, spark or flame producing operations such as welding, brazing, or grinding.
- Develop and monitor effective hot work procedures.
- Provide safe equipment for hot work.
- Provide proper and effective PPE for all hot work.
- Monitor all hot work operations.
- Ensure all hot work equipment and PPE are in safe working order.
- Allow only trained and authorized employees to conduct hot work and conduct inspections of the hot work area before operations begin.
- Ensure permits are used for all hot work outside authorized areas.

Employees

- Follow all hot work procedures; properly use appropriate hot work PPE.
- Inspect all hot work equipment before use; report any equipment problems or unsafe conditions.

23.5 HAZARDS

- Fumes, Gases, Vapours
- Fire & Explosion
- Burns
- Shock Hazard
- Pinch Points
- Compressed gases
- Welder's Flash - Radiation Hazards
- Foot Injuries – falling objects
- Noise
- Ergonomic- Musculoskeletal injuries

Fumes, Gases & Vapours

Welding fumes are a complex mixture of metallic oxides, silicates and fluorides. Fumes are formed when a metal is heated above its boiling point and its vapours condense into very fine, particles (solid particulates).

The composition of welding fumes vary. Welding fumes contain oxides of the metals in the material being welded.

- Fluxes containing silica or fluoride produce amorphous silica, metallic silicates and fluoride fumes.
- Fumes from mild steel welding contain mostly iron with small amounts of additive metals (chromium, nickel, manganese, molybdenum, vanadium, titanium, cobalt, copper etc.).
- Stainless steels have larger amounts of chromium or nickel in the fume and lesser amounts of iron.
- Nickel alloys have much more nickel in the fume and very little iron.

Coatings change the composition of welding fumes. Vapours or fumes can come from coatings and residues on metal being welded. Some ingredients in coatings can have toxic effects. These ingredients include:

- metal working fluids, oils and rust inhibitors
- zinc on galvanized steel (vaporizes to produce zinc oxide fume)
- cadmium plating
- vapours from paints and solvents
- lead oxide primer paints
- some plastic coatings

The removal of coating will also improve weld quality.

- Use stripping products to remove coatings. Make sure to remove any residues before welding.
- Use wet slurry vacuum removal techniques for removing very toxic coatings.
- Do not grind coatings. Grinding dust may be toxic.

Welding gases are gases used or produced during welding and cutting processes like shielding gases or gases produced by the decomposition of fluxes or from the interaction of ultraviolet light or high temperatures with gases or vapours in the air.

Examples of welding gases

Gases used in welding and cutting processes include:

- Shielding gases such as carbon dioxide, argon, helium, etc.
- Fuel gases such as acetylene, propane, butane, etc.
- Oxygen, used with fuel gases and also in small amounts in some shielding gas mixtures

Gases produced from welding and cutting processes include:

- Carbon dioxide from the decomposition of fluxes

- Carbon monoxide from the breakdown of carbon dioxide shielding gas in arc welding
- Ozone from the interaction of electric arc with atmospheric oxygen
- Nitrogen oxides from the heating of atmospheric oxygen and nitrogen
- Hydrogen chloride and phosgene produced by the reaction between ultraviolet light and the vapours from chlorinated hydrocarbon degreasing solvents (e.g., trichloroethylene, TCE)

Gases are also produced from the thermal breakdown of coatings:

- Polyurethane coatings can produce hydrogen cyanide, formaldehyde, carbon dioxide, carbon monoxide, oxides of nitrogen, and isocyanate vapours.
- Epoxy coatings can produce carbon dioxide and carbon monoxide.
- Vinyl paints can produce hydrogen chloride.
- Phosphate rust-inhibiting paints can release phosphine during welding processes.
- Minimizing exposure to degreasing solvent vapours.

Hazards from gases include:

- asphyxiation (lack of oxygen)
- fire or explosion
- toxicity

SOURCE AND HEALTH EFFECT OF WELDING FUMES		
FUME TYPE	**SOURCE**	**HEALTH EFFECT**
Aluminum	Aluminum component of some alloys, e.g., Inconels, copper, zinc, steel, magnesium, brass and filler materials.	Respiratory irritant.
Beryllium	Hardening agent found in copper, magnesium, aluminum alloys and electrical contacts.	"Metal Fume Fever." A carcinogen. Other chronic effects include damage to the respiratory tract.
Cadmium Oxides	Stainless steel containing cadmium or plated materials, zinc alloy.	Irritation of respiratory system, sore and dry throat, chest pain and breathing difficulty. Chronic effects include kidney damage and emphysema. Suspected carcinogen.
Chromium	Most stainless-steel and high-alloy materials, welding rods. Also used as plating material.	Increased risk of lung cancer. Some individuals may develop skin irritation. Some forms are carcinogens (hexavalent chromium).
Copper	Alloys such as Monel, brass, bronze. Also some welding rods.	Acute effects include irritation of the eyes, nose and throat, nausea and "Metal Fume Fever."
Fluorides	Common electrode coating and flux material for both low- and high-alloy steels.	Acute effect is irritation of the eyes, nose and throat. Long-term exposures may result in bone and joint problems. Chronic effects also include excess fluid in the lungs.
Iron Oxides	The major contaminant in all iron or steel welding processes.	Siderosis – a benign form of lung disease caused by particles deposited in the lungs. Acute symptoms include irritation of the nose and lungs. Tends to clear up when exposure stops.

Lead	Solder, brass and bronze alloys, primer/coating on steels.	Chronic effects to nervous system, kidneys, digestive system and mental capacity. Can cause lead poisoning.
Manganese	Most welding processes, especially high-tensile steels.	"Metal Fume Fever." Chronic effects may include central nervous system problems.
Molybdenum	Steel alloys, iron, stainless steel, nickel alloys.	Acute effects are eye, nose and throat irritation, and shortness of breath.
Nickel	Stainless steel, Inconel, Monel, Hastelloy and other high-alloy materials, welding rods and plated steel.	Acute effect is irritation of the eyes, nose and throat. Increased cancer risk has been noted in occupations other than welding. Also associated with dermatitis and lung problems.
Vanadium	Some steel alloys, iron, stainless steel, nickel alloys.	Acute effect is irritation of the eyes, skin and respiratory tract. Chronic effects include bronchitis, retinitis, fluid in the lungs and pneumonia.
Zinc	Galvanized and painted metal.	Metal Fume Fever.

SOURCE AND HEALTH EFFECT OF WELDING GASES		
GAS TYPE	**SOURCE**	**HEALTH EFFECT**
Carbon Monoxide	Formed in the arc.	Absorbed readily into the bloodstream, causing headaches, dizziness or muscular weakness. High concentrations may result in unconsciousness and death
Hydrogen Fluoride	Decomposition of rod coatings.	Irritating to the eyes and respiratory tract. Overexposure can cause lung, kidney, bone and liver damage. Chronic exposure can result in chronic irritation of the nose, throat and bronchi.
Nitrogen Oxides	Formed in the arc.	Eye, nose and throat irritation in low concentrations. Abnormal fluid in the lung and other serious effects at higher concentrations. Chronic effects include lung problems such as emphysema.
Oxygen Deficiency	Welding in confined spaces, and air displacement by shielding gas.	Dizziness, mental confusion, asphyxiation and death.
Ozone	Formed in the welding arc, especially during plasma-arc, MIG and TIG processes.	Acute effects include fluid in the lungs and hemorrhaging. Very low concentrations (e.g., one part per million) cause headaches and dryness of the eyes. Chronic effects include significant changes in lung function.

SOURCE AND HEALTH EFFECT OF ORGANIC VAPOURS AS A RESULT OF WELDING		
GAS TYPE	**SOURCE**	**HEALTH EFFECT**
Aldehydes (such as formaldehyde)	Metal coating with binders and pigments. Degreasing solvents	Irritant to eyes and respiratory tract.
Diisocyanates	Metal with polyurethane paint.	Eye, nose and throat irritation. High possibility of sensitization, producing asthmatic or other allergic symptoms, even at very low exposures.
Phosgene	Metal with residual degreasing solvents. (Phosgene is formed by reaction of the solvent and welding radiation.)	Severe irritant to eyes, nose and respiratory system. Symptoms may be delayed.
Phosphine	Metal coated with rust inhibitors. (Phosphine is formed by reaction of the rust inhibitor with welding radiation.)	Irritant to eyes and respiratory system, can damage kidneys and other organs.

Sources: Information & Tables above are from Work Safe Alberta's Welder's Guide to Hazards of Welding Gases and Fumes, 2009

23.6 SAFE JOB PROCEDURES

Preventing exposure to welding gases:

It is important to follow manufacturer's instructions, SDSs, and safety protocols to minimize the hazards of welding gases.

- Use substitute materials such as water-based cleaners or high flash point solvents.
- Cover the degreaser baths or containers.
- Do not weld on surfaces that are still wet with a degreasing solvent.
- Do not weld near degreasing baths.
- Do not use chlorinated hydrocarbon degreasers.
- Have adequate ventilation in a workplace to prevent the displacement or enrichment of oxygen and to prevent the accumulation of flammable atmospheres.

Control Tech must ensure a hot work permit is completed before performing hot work:

- A hot work permit is issued that indicates the nature of the hazard, the type and frequency of atmospheric testing required, the safe work procedures and precautionary measures to be taken and the protective equipment required.
- The hot work location is cleared of combustible materials or suitably isolated from combustible materials.
- Procedures are implemented to ensure continuous safe performance of the hot work.
- Testing shows that the atmosphere does not contain a flammable substance, in a mixture with air, in an amount exceeding 20 percent of that substance’s lower explosive limit for gas or vapours, or the minimum ignitable concentration for dust.

Control Tech hot work must comply with the requirements of CSA Standard W117.2-06, Safety in Welding, Cutting, and Allied Processes (or current version).

Fire extinguishers must be readily available while hot work is performed. At least one fire extinguisher of a suitable type and capacity must be immediately available at a work location where welding or cutting is done. Fire extinguisher locations must be marked and made known to workers.

Gas welding, burning, and/or cutting equipment shall be properly maintained. No gas welding, burning, or cutting equipment shall be used unless it is free from defects, leaks, oil and grease.

Precautions to prevent a fire shall be taken when using a blow torch or welding or cutting equipment or a similar piece of equipment. Before cutting or welding is permitted the area shall be inspected by a Control Tech supervisor responsible for inspection and granting authorized welding and cutting operations. Precautions that are to be taken shall be in the form of a written Hot Work permit.

The work area is inspected before hot work begins. Control Tech must ensure that, before a welding or allied process is commenced, the area surrounding the operation is inspected and all combustible, flammable, or explosive material, dust, gas, or vapour is removed, or alternate methods of rendering the area safe are implemented.

Ducts, conveyor systems, and augers that might carry sparks to distant combustibles shall be protected or shut down. Where cutting or welding is done near walls, partitions, ceilings, or openings in the floor (grating, manholes, etc.), fire-resistant shields or guards shall be provided to prevent ignition.

If welding is to be done on a metal wall, partition, ceiling, or solid decking/flooring, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation of heat. Where combustibles cannot be relocated on the opposite side of the work a fire watch person shall be provided on the opposite side of the work.

Welding shall not be attempted on a metal partition, wall, and ceiling or decking/flooring constructed of combustible sandwich panels.

Cutting or welding on pipes or other metal in contact with combustible walls, partitions, floors, ceilings or roofs shall not be undertaken if the work is close enough to cause ignition by combustion.

The connections between the cylinder, hose, and regulator are tested for leaks before operation. Before using gas welding or burning equipment, the operator must ensure that the equipment is free from defects, leaks, oil and grease.

Control Tech must protect persons when performing hot work above workers. If a welding or allied process is performed above an area where a worker may be present, Control Tech must ensure that adequate means are taken to protect a worker below the operation from sparks, debris, and other falling hazards.

Gas management systems are equipped with flash back arrestors between the torch and regulator. Suitable safety devices to prevent reverse gas flow and to arrest a flashback must be installed on each hose in an oxy-fuel system, between the torch and the regulator.

Cutting or welding shall not be permitted in the following situations:

- In areas not authorized by management.
- In sprinkled buildings while such protection is impaired.
- In the presence of potentially explosive atmospheres, e.g. flammables.
- In areas near the storage of large quantities of exposed, readily ignitable materials.
- All dust accumulation shall be cleaned up before welding or hot work is permitted.

Whenever welding or cutting is performed in locations where other than a minor fire might develop or any of the conditions mentioned above cannot be met, a fire watch shall be provided:

- The fire watch shall be provided during and for a minimum of 1/2 hour past the completion of the welding project.
- The fire watch shall be trained in the use of fire extinguishers and the facility's alarm system.
- During this time the fire watch will have appropriate fire extinguishers readily available.
- Suitable extinguishers shall be provided and maintained ready for instant use.
- A hot-work permit will be issued on all welding or cutting outside of the designated welding area.

Any person performing a gas welding or allied process tests a regulator and its flexible connecting hose immediately after it is connected to a gas cylinder to ensure that there is no leak of the gas supply.

Containers that may have held an explosive or flammable substance are purged before performing hot work on them. A container which may have held a combustible substance must be thoroughly cleaned before any welding or burning operation is carried out on the container. If an object to be welded or cut cannot be moved and if all the hire hazards cannot be removed, then guards shall be used to confine the heat sparks and slag and to protect the immovable fire hazards.

23.6.1 CLEANING COMPOUNDS

In the use of cleaning materials, because of their possible toxicity or flammability, appropriate precautions such as manufacturer instructions shall be followed, also:

- Degreasing and other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapours from these operations will reach or be drawn into the atmosphere surrounding any welding operation.
- In addition, trichloroethylene and perchloroethylene shall be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

A designated welding area shall be established to meet the following requirements:

- Floors swept and cleaned of combustibles within 35 feet of work area.
- Flammable and combustible liquids and material will be kept 35 feet from work area.
- Adequate ventilation providing 20 air changes per hour.
- At least one fire extinguisher of a suitable type and capacity must be immediately available at a work location where welding or cutting is done.
- Fire extinguisher locations must be marked and made known to workers.
- Protective dividers such as welding curtains or non-combustible walls will be provided to contain sparks and slag to the combustible free area.

23.6.2 FIRE SUPPRESSION

Fire suppression equipment shall be readily available when performing hot work. A device to extinguish a fire that may be caused by heat or cuttings produced during welding, burning, or cutting shall be provided with each oxygen-acetylene unit. The device shall have a capacity for extinguishing a fire that is equal to or greater than a minimum Underwriters' Laboratories of Canada classification of 1A 10B and be suitable for class A and B fires.

23.6.3 FIRE WATCH REQUIREMENTS

A fire watch shall be under these conditions as a minimum

- Locations where other than a minor fire might develop.
- Combustible materials are closer than 35 feet to the point of operation.
- Combustibles that are 35 feet or more away but are easily ignited.
- Combustible materials are adjacent to the opposite side of metal partitions, ceilings or roofs.

Fire watch personnel MUST be maintained at least a half an hour after welding or cutting operations have been completed.

Requirements for welding conducted outside the designated welding area

- Portable welding curtains or shields must be used to protect other workers in the welding area.
- A hot-work permit must be completed and complied with prior to initiating welding operations.

- Respiratory protection is mandatory unless an adequate monitored airflow away from the welder and others present can be established and maintained.
- Plastic materials must be covered with welding tarps during welding procedures.
- Fire Watch must be provided for all hot-work operations.

After welding operations are completed, recently welded or flame cut work must be marked "HOT" or effectively guarded to prevent contact by a worker, if a worker not directly involved in the hot work is likely to enter the work area.

Welding work areas shall be kept free of electrode stubs, metal scrap and other slipping or tripping hazards and receptacles for electrode stubs shall be provided and used.

23.6.4 SAFE HANDLING AND STORAGE OF COMPRESSED GAS CYLINDERS

A compressed gas cylinder must not be hoisted by a sling or magnet, dropped, subjected to impact, handled by the regulator, or used as a roller or work support.

A compressed gas cylinder must be secured to prevent falling or rolling during storage, transportation and use, and where practicable, must be kept in the upright position.

The valve on a compressed gas cylinder must be kept closed when the cylinder is empty or not in use.

A worker must not stand directly in front of a regulator attached to a compressed gas cylinder when the cylinder valve is being opened.

Unless a compressed gas cylinder is equipped with an integral valve guard, the valve cover must be in position when the cylinder is not connected for use. An empty compressed gas cylinder must be identified as being empty and must be stored separately from other compressed gas cylinders.

A compressed gas cylinder containing acetylene must be used only in the upright position.

If the cylinder has been stored or transported in a horizontal position, it must be placed in the upright position for at least 1 hour before it is used.

A suitable device for closing the valve on an acetylene cylinder must be immediately available when the cylinder is connected for use.

<u>Control Tech must also ensure that:</u>

- Compressed or liquefied gas containers are used, handled, stored, and transported in accordance with the manufacturer's specifications.
- A cylinder of compressed flammable gas is not stored in the same room as a cylinder of compressed oxygen, unless the storage arrangements are in accordance Provincial Fire Code.
- Compressed or liquefied gas cylinders, piping, and fittings are protected from damage during handling, filling, transportation, and storage.
- Compressed or liquefied gas cylinders are equipped with a valve protection cap if manufactured with a means of attachment.
- And oxygen cylinders or valves, regulators, or other fittings of the oxygen using apparatus or oxygen distributing system are kept free of oil and grease.

Cylinder valves shall be closed and hoses drained when work is finished and when cylinders are spent or not being used, and valve protection covers shall be kept in position when the cylinders are not connected for use.

<u>Compressed gas cylinders shall be</u>

- approved and legibly marked near the shoulder of the cylinder for the purpose of identifying the gas content with either the chemical or trade name of the gas,
- kept away from sources of heat and from radiators and piping systems that may be used for grounding purposes,
- stored valve-end up
- secured against falling during storage, transportation or use, and
- stored and used only in the upright position

Compressed gas cylinders shall not be

- hoisted by slings,
- dropped or subjected to impact,
- lifted by the valve protection caps, the regulators must be removed and cylinders shall not be dropped or permitted to strike each other,
- tampered with nor should any attempt be made to repair them,
- kept in unventilated enclosures such as lockers and cupboards, or
- dropped, hoisted by slings or magnets or transported or stored in a horizontal position

Assigned storage spaces shall be located where cylinders cannot be knocked over or damaged by falling objects or subject to tampering by unauthorized persons.

Additionally:

- Back flow protection shall be provided by an approved device that will prevent oxygen from flowing into the fuel-gas system or fuel from flowing into the oxygen system.
- An approved device that will prevent flame from passing into the fuel-gas system shall provide flashback protection.
- An approved pressure-relief device set at the appropriate pressure shall provide backpressure protection.

Special care must be taken when transporting gas cylinders

- Cylinders must be secured with valve cap installed.
- Removed regulators must be carried in the cab of the vehicle.
- They shall be handled carefully - rough handling, knocks, or falls are liable to damage the cylinder, valve or safety device and cause leakage.
- Safety devices shall not be tampered with.

23.7 WELDING EQUIPMENT AND SAFETY

All equipment will meet manufacturer's specifications. Control Tech must ensure that welding or allied process equipment is erected, installed, assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired and dismantled in accordance with the manufacturer's specifications.

Protective screens are used to protect employees in the area of arc welding activities from harmful radiation. Arc welding must not be carried out unless workers who may be exposed to radiation from the arc flash are protected by adequate screens, curtains or partitions or wear suitable eye protection.

A screen, curtain or partition near an arc welding operation must be made of or be treated with a flame resistant material or coating and must have a non-reflective surface finish.

All personnel operating, installing, and maintaining welding equipment shall be qualified or trained to operate and maintain such equipment.

- All workmen assigned to operate or maintain equipment shall be familiar with and electrical welding equipment shall be chosen for safe operation and comply with applicable standard.
- Arc welding equipment must be designed to meet conditions such as exposure to corrosive fumes, excessive humidity, excessive oil vapour, flammable gasses, abnormal vibration or shock, excessive dust and seacoast or shipboard conditions.
- It shall be operated at recommended voltage in accordance to the manufacturer recommendations.
- All leads shall be periodically inspected and replaced if insulation is broken or splices are unprotected.
- Leads shall not be repaired with electrical tape.
- All ground connections shall be checked to determine that they are mechanically strong and electrically adequate for the required current.

A disconnecting switch or controller shall be provided at or near each welding machine along with over current protection.

All direct current machines shall be connected with the same polarity and all alternating current machines connected to the same phase of the supply circuit and with the same polarity. Additionally:

- To prevent electrical contact with personnel, all electrode holders shall be placed where they do not make contact with persons, conducting objects or the fuel of compressed gas tanks.
- All cables with splices within 10 feet of the holder shall not be used.

23.7.1 RESISTANCE WELDING

All personnel operating, installing, and maintaining welding equipment shall be qualified or trained to operate and maintain such equipment. Additionally:

- Voltage, interlocks, guarding, grounding and shields shall be in accordance with manufacturer recommendations.
- Precautions such as flash guarding, ventilation and shields shall be provided to control flashes, toxic elements and metal fumes.

If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed.

23.7.2 SIGNS

Recently welded or flame cut work must be labelled/signed or marked "HOT" or effectively guarded to prevent contact by a worker, if a worker not directly involved in the hot work is likely to enter the work area.

23.7.3 OXYGEN FUEL GAS WELDING AND CUTTING

Only approved apparatuses such as torches, regulators or pressure-reducing valves, setting generators and manifolds shall be used:

- Mixtures of fuel gases and air or oxygen may be explosive and must be guarded against.
- All hoses and hose connections shall comply with the applicable standards.
- Workers in charge of the oxygen or fuel-gas supply equipment, including generators, shall be instructed and judged competent by Control Tech before being left in charge.

23.7.4 FIRST AID EQUIPMENT

First aid equipment shall be available at all times. All injuries shall be reported as soon as possible for medical attention. First aid shall be rendered until medical attention can be provided.

23.7.5 PPE REQUIREMENTS

Employees performing hot work shall be provided adequate protective equipment. Protection for workers to protect them against injury from fumes, radiation, and electric arcs produced during welding, burning, or cutting operations shall be provided and used.

PPE requirements for workers involved in hot work activity include:

- Flame resistant work clothing
- Gauntlet gloves of leather or other suitable material and arm protection
- An apron of leather or other suitable material for heavy work
- Eye and face protection against harmful radiation, particles of molten metal, and while chipping and grinding welds
- Substantial safety footwear made of leather or other suitable material.
- Respirator

23.8 HEXAVALENT CHROMIUM

23.8.1 RESPONSIBILITIES

Managers/Supervisors

- Shall ensure that all employees are aware of the proper work procedures for hexavalent chromium
- Shall ensure that initial training is conducted for all new employees and that retraining is conducted when employee behaviors suggest that retraining is warranted.
- As part of the JSA and other hazard evaluation processes, identifies and evaluates chromium hazards and potential exposures during planning and the conduct of work.
- Reviews and approves the Task-Specific Safety Analysis.
- As necessary, quantitatively determines the presence of chromium in materials, substrates, and other media. This may involve the collection of samples for analysis by a qualified laboratory or field testing using acceptable test methods.
- Provides results of any chromium survey to management/supervision, along with information regarding hazard potential and control measures. As appropriate, makes recommendations to management/supervision to maintain, modify, upgrade, or downgrade controls accordingly.
- Takes prompt corrective measures (or supports any Competent Person in this role) to eliminate hazards; such as recommending to management/supervision to implement or modify engineering, administrative, work practice, and personal protection (including respiratory protection) controls.
- Conducts periodic exposure assessment.
- As appropriate, assists management/supervision in ensuring that workers have the necessary training and medical surveillance based upon the activity and hazard.
- Ensures that medical monitoring is conducted in accordance with OHS (for chromium) including imposition of work restrictions where appropriate and reviewing results of medical monitoring.
- In evaluating chromium hazards and specifying controls for a job
- utilizes reliable historical exposure monitoring data generated for other similar operations or activities,
- utilizes objective data, and/or
- plans and conducts initial monitoring to determine exposures and assess the effectiveness of hazard controls
- Conducts initial and periodic exposure monitoring in accordance with National Institute for Occupational Health and Safety (NIOSH)/OHS methods if lacking historical or objective data.
- Maintains effective records of jobs monitored, so that a historical database can be used to specify controls and eliminate unnecessary and redundant monitoring for future activities.
- Supports project management/supervision in responding to exposures above the PEL when workers were not adequately protected.

- As appropriate, participates in pre-job and daily worker briefings regarding task-specific chromium hazards and controls, work practices/plans (such as JSAs), and other applicable information, including any changes that are made to controls or to the work practices or plans.

Employees

- Shall follow all requirements regarding the safe work procedures for hexavalent chromium.

23.8.2 WELDING, CUTTING, AND GRINDING

Certain welding and cutting activities have been shown to expose the welder/cutter, and potentially helpers, to hexavalent chromium above the action level when exhaust ventilation is not used. The activities have included the following:

- Shielded metal arc welding, Gas metal arc welding
- Flux cored arc welding, Sub arc welding
- Torch cutting through chromate-containing paints, grinding chromium-containing metals.

The types of metal involved have been stainless steel, chromium-containing alloy steel, and chromium-containing nonferrous alloys. Exposure has also occurred when the welding rod or wire in use contains chromium, and exhaust ventilation is not used.

Therefore, exhaust ventilation is always prescribed as a control measure when activities with the materials mentioned above are in use unless historical personal monitoring data performed when similar materials, using similar methods, under similar environmental conditions are used shows conclusively that the welder/cutter and helper (if applicable) are not exposed above the action level without regard to respiratory protection.

Practices and procedures shall ensure that no employee is exposed to hexavalent chromium in excess of the permissible exposure level which is 5 micrograms per cubic meter of air based on an 8 hour Time Weighted Average.

23.8.3 PLASMA AND AIR ARC CUTTING AND GOUGING

Plasma and air arc cutting and gouging operations have been shown to expose the worker and helpers within 10 feet of the work to levels of hexavalent chromium above the permissible exposure limit (PEL) under most circumstances and conditions. Exhaust ventilation and respiratory protection (at least a half-face, tight-fitting respirator with a HEPA filter/cartridge) are always prescribed as control measures when activities with the materials mentioned above are in use; a higher level of respiratory protection may be prescribed, depending on conditions.

NOTE: Each discrete task must begin with ventilation and respiratory protection control measures in place.

Respiratory protection may be downgraded only upon conclusive results of breathing zone monitoring of the employee(s) involved in each discrete task showing exposure to be less than 50 percent of the protection factor of the respirator relative to the concentration and PEL of hexavalent chromium. Respiratory protection may be eliminated only upon conclusive results of breathing-zone monitoring of the employee(s) involved in each discrete task showing exposure to be less than the PEL as an 8-hour time-weighted average.

Additional controls may also be appropriate to be in compliance with legislation, depending on the results of evaluations of the materials to be used, environmental conditions, length of the work process/activity, etc.

Employees who are exposed at or above the action level 30 days or more per year are enrolled in a medical surveillance program.

Personal hygiene is very important while working with chromium products. To avoid accidental ingestion of chromium, employees wash thoroughly (regardless of other controls) prior to eating, chewing, smoking, or drinking.

23.8.4 SAFEWORK PRACTICES

Control Tech Management/supervision supported by safety professional(s), the medical contractor and training providers conducts the following basic steps to control exposure to chromium:

- Determine the types of projects, activities, and operations that could involve chromium, or chromium-containing materials. For those jobs, conduct hazard identification as part of the work design, planning, and control process.
- If chromium materials are involved, ensure that project safety or a competent person conducts a hazard evaluation to determine the potential exposure and to recommend initial controls.
- Develop and implement a Task-Specific Safety when exposure is or is likely to be above the PEL. The JSA (or equal) addresses the scope of work activities; provides initial exposure assessment; and prescribes exposure controls, air-monitoring requirements, work practices, personal protective equipment and additional information as required.
- Incorporate recommendations from project safety for chromium hazard control measures into any JSA and work control documents.

Exposure Monitoring

Monitoring or measuring of employee exposure shall be conducted at least every 6 months if the initial monitoring shows employee exposure. Air monitoring will be performed at the beginning of each job task. If exposure monitoring results indicate exposure is above the PEL Control Tech must include in the written notification to employees the corrective action being taken to reduce exposure to or below the PEL.

- Notify each affected employee, in writing, of the results of monitoring within five (5) working days.
- Air monitoring for chromium may be waived provided the following conditions are met:
- Monitoring has been performed in the last 12 months.
- Data from historical monitoring originates from work operations that closely resemble the planned work operations.
- Workplace and environmental conditions (such as indoors or outdoors, temperature, wind speed, ventilation, and space configuration) are similar to those when the monitoring was performed.
- The processes, types of material, control methods and work practices are similar.
- Justification for waving initial monitoring shall be included in the Task-Specific Safety Analysis or equal. Employees involved are briefed regarding the existence of such data.

Surveillance

Medical surveillance shall be provided when an employee experiences signs or symptoms of the adverse health effects of Hexavalent Chromium (dermatitis, asthma, bronchitis, etc.). Medical evaluations will be provided at no cost to employees. Examinations will be performed by or under the supervision of a physician or other licensed health care professional.

Facilities

Control Tech must provide change rooms for decontamination and ensure facilities prevent cross-contamination. Washing facilities shall be readily accessible for removing chromium from the skin. Workers must wash their hands and face or any other potentially exposed skin before eating, drinking or smoking.

Regulated Areas

Regulated areas shall be established when exposure to an employee is or is expected to be in excess of the PEL. Regulated areas shall be marked with warning signs to alert employees and access is restricted to authorized persons only.

Controls

If the exposure level is above the PEL for 30 days or more then engineering controls and work practices shall be provided to reduce exposure to the lowest feasible level. If employees can demonstrate that such controls are not feasible Control Tech shall use engineering and or work controls to reduce employee exposure to the lowest levels achievable and shall supplement them by the use of required respiratory protection.

Recordkeeping

Control Tech is required to maintain and make available an accurate record of all employee exposure monitoring, medical surveillance and training records.

Respiratory Protection & PPE

The appropriate respirator shall be used when engineering controls and work practices cannot reduce employee exposure during work operations where engineering controls and work practices are not feasible and emergencies. Respirators shall be provided in accordance with OHS Respiratory Protection (see Control Tech Respiratory Protection Program). Specific requirements regarding respiratory protection shall also be followed including:

- Providing employees with full face piece respirators when they experience eye irritation.
- Providing HEPA filters for powered and non-powered air-purifying respirators.
- Providing a powered air-purifying respirator instead of a negative-pressure respirator when an employee entitled to a respirator chooses to use this type of respirator and such a respirator will provide adequate protection to the employee.

PPE will be provided when there is a hazard from skin or eye contact and employees are required to use the PPE. Gloves, aprons, coveralls, goggles, foot covers and other as needed PPE shall be provided at no cost to the employee and will be removed at the end of the work shift. Control Tech must clean, launder and replace all protective clothing as needed.

Housekeeping

All surfaces shall be maintained as free as practicable of chromium. All spills and releases of chromium shall be cleaned promptly with approved procedures including use of HEPA filtered vacuums as the primary method, dry or wet sweeping or other methods to minimize the likelihood of exposure to chromium.

No compressed air shall be used to remove chromium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air or no alternative method is feasible.

Cleaning equipment must be handled in a manner that minimizes the re-entry of chromium into the workplace.

Training

Control Tech shall provide appropriate types of training for employees who are potentially exposed to chromium prior to their initial assignment and annually thereafter. Control Tech will assure employee participation and maintain a record of the training contents. This training includes:

- Hazard communication training for potentially exposed employees.
- Training specified by the applicable chromium standard for workers exposed at the action level for any one day, or who are exposed to chromium compounds that are skin irritants.
- Respirator training if respirators are to be used.

- Provide information to workers regarding task-specific chromium hazards and control methods, the JSA, work practices, medical surveillance and other applicable information, including any changes that are made to these controls.
- Provide training annually, as appropriate, to workers who continue to have exposure to chromium at or above the action level on any one day.
- All training will be recorded and include the identity of the employee trained, the signature of the person who conducted the training and the date of the training.
- Training records must be kept for one year.

23.9 CADMIUM AWARENESS

23.9.1 RESPONSIBILITIES

Managers/Supervisors

- Shall ensure that all employees are aware of the proper work procedures for cadmium
- Shall ensure that initial training is conducted for all new employees and that retraining is conducted when employee behaviors suggest that retraining is warranted.
- As part of the JSA and other hazard evaluation processes, identifies and evaluates cadmium hazards and potential exposures during planning and the conduct of work.
- Reviews and approves the Task-Specific Safety Analysis.
- As necessary, quantitatively determines the presence of cadmium in materials, substrates, and other media. This may involve the collection of samples for analysis by a qualified laboratory or field testing using acceptable test methods.
- Provides results of any cadmium survey to management/supervision, along with information regarding hazard potential and control measures. As appropriate, makes recommendations to management or supervisors to maintain, modify, upgrade, or downgrade controls accordingly.
- Takes prompt corrective measures (or supports any Competent Person in this role) to eliminate hazards; such as recommending to management/supervision to implement or modify engineering, administrative, work practice, and personal protection (including respiratory protection) controls.
- Conducts periodic exposure assessment.
- As appropriate, assists management/supervision in ensuring that workers have the necessary training and medical surveillance based upon the activity and hazard.
- Ensures that medical monitoring is conducted in accordance with legislation (for cadmium) including imposition of work restrictions where appropriate and reviewing results of medical monitoring.
- In evaluating cadmium hazards and specifying controls for a job
- utilizes reliable historical exposure monitoring data generated for other similar operations or activities, utilizes objective data, and/or
- plans and conducts initial monitoring to determine exposures and assess the effectiveness of hazard controls
- Conducts initial and periodic exposure monitoring in accordance with National Institute for Occupational Safety and Health (NIOSH)/OSHA methods if lacking historical or objective data.
- Maintains effective records of jobs monitored, so that a historical database can be used to specify controls and eliminate unnecessary and redundant monitoring for future activities.
- Supports project management/supervision in responding to exposures above the PEL when workers were not adequately protected.
- As appropriate, participates in pre-job and daily worker briefings regarding task-specific cadmium hazards and controls, work practices/plans (such as JSAs), and other applicable information, including any changes that are made to controls or to the work practices or plans.

Employees

- Shall follow all requirements regarding the safe work procedures for cadmium.

23.9.2 SAFE JOB PROCEDURES

Compliance Program

A written site specific compliance program shall be implemented when the PEL for cadmium is exceeded at a work site.

The written site safety program for cadmium shall be submitted to the safety manager for review and approval. It must address the following items:

- Description of each operation where cadmium is omitted, machinery use, material processed, controls in place, crew size, employee job responsibilities and maintenance practices.
- A description of the specific means that will be employed to meet compliance including engineering plans.
- A report of technology considered in meeting the PEL.
- Air monitoring data.
- A detailed schedule for implementation.
- A work practice program.
- A written plan for emergency situations.
- Other relevant information.

Monitoring and Action Levels

A compliance program must be implemented. At 2.5 micrograms per cubic meter of air calculated as an 8-hour time weighted average, a written compliance program shall be implemented when the PEL is exceeded. The action level (AL) of 2.5 micrograms triggers the following requirements:

- Pre-job planning includes, as needed, a thorough identification of cadmium materials. Identification may include the product name, a Safety Data Sheet (SDS) with the SDS number (if available) or a sample content analysis. Sampling data includes location, sampling method, sampling dates, laboratory identification, and analytical method.
- If documentation is not feasible or has been determined by the project engineer to be unavailable or unreliable, cadmium content sufficient to exceed the action level for cadmium is assumed.

Medical Surveillance

Medical surveillance shall be provided for employees who are or may be exposed to cadmium at or above the action level. Medical evaluations will be provided at no cost to employees. Examinations will be performed by or under the supervision of a physician or other licensed health care professional.

Monitoring or measuring of employee exposure shall be conducted at least every 6 months if the initial monitoring shows employee exposure. Air monitoring will be performed at the beginning of each job task. If exposure monitoring results indicate exposure is above the PEL Control Tech must include in the written notification to employees the corrective action being taken to reduce exposure to or below the PEL.

- Notify each affected employee, in writing, of the results of monitoring within five (5) working days.
- Air monitoring cadmium may be waived provided the following conditions are met:
- Monitoring has been performed in the last 12 months.
- Data from historical monitoring originates from work operations that closely resemble the planned work operations.
- Workplace and environmental conditions (such as indoors or outdoors, temperature, wind speed, ventilation, and space configuration) are similar to those when the monitoring was performed.
- The processes, types of material, control methods and work practices are similar.

- Justification for waving initial monitoring shall be included in the Task-Specific Safety Analysis or equal. Employees involved are briefed regarding the existence of such data.

Emergency Plans

Control Tech must have a written plan for dealing with emergency situations involving substantial releases of cadmium. The following areas shall be addressed within the site compliance program and to ensure emergency plans are in place should a release of cadmium occur:

- Respiratory protection use and other required PPE that shall be ready for use based on the scenario.
- Air monitoring data or developing a justification for not conducting monitoring based on previous monitoring/historical data or objective data.
- Engineering controls including the specific means that will be employed to meet compliance.
- A report of technology considered in meeting the PEL.
- A detailed schedule of implementation.
- A documented, written plan for dealing with emergency situations involving a substantial release of cadmium.
- Work practice program.
- Other relevant information such as protective clothing, housekeeping, hygiene areas and practices (including consideration of shower facilities), consideration of medical surveillance, training and recordkeeping.

Maintenance Procedures

Procedures shall be developed and implemented to minimize employee exposure to cadmium when maintenance of ventilation systems and changing of filters.

Examples include: Proper use of PPE, use of HEPA filtered vacuums, wet sweeping or other methods to minimize the likelihood of exposure to cadmium. No compressed air shall be used to remove cadmium from any surface.

Cleaning equipment must be handled in a manner that minimizes the re-entry of cadmium into the workplace.

Reviews and Updates of Written Procedures

- The written program must be reviewed and updated annually or more often to reflect significant changes in the compliance status for Control Tech.
- Program must be provided for examination and copying upon request of affected employees, their representatives or the Assistant Secretary and the Director of OSHA.

Respiratory Protection & PPE

The appropriate respirator shall be used when engineering controls and work practices cannot reduce employee exposure during work operations where engineering controls and work practices are not feasible and emergencies. Respirators shall be provided in accordance with legislation requirements (Respiratory Protection) (see Control Tech Respiratory Protection Program). Specific requirements contained within the legislation (Cadmium) regarding respiratory protection shall also be followed including:

- Providing employees with full face piece respirators when they experience eye irritation.
- Providing HEPA filters for powered and non-powered air-purifying respirators.
- Providing a powered air-purifying respirator instead of a negative-pressure respirator when an employee entitled to a respirator chooses to use this type of respirator and such a respirator will provide adequate protection to the employee.

PPE will be provided when there is a hazard from skin or eye contact and employees are required to use the PPE. Gloves, aprons, coveralls, goggles, foot covers and other as needed PPE shall be provided at no cost to the employee

and will be removed at the end of the work shift. Control Tech must clean, launder and replace all protective clothing as needed.

Training

Control Tech must institute a training program for all employees who are potentially exposed to cadmium, assure employee participation and maintain a record of contents. Training must be provided prior to initial assignment and at least annually. This training includes:

- Hazard communication training for potentially exposed employees.
- Training specified by the applicable cadmium standard for workers exposed at the action level for any one day, or who are exposed to cadmium compounds that are skin irritants.
- Respirator training if respirators are to be used.
- Provide information to workers regarding task-specific cadmium hazards and control methods, the JSA, work practices, medical surveillance and other applicable information, including any changes that are made to these controls.
- Provide training annually, as appropriate, to workers who continue to have exposure to cadmium at or above the action level on any one day.

23.10 TRAINING

Persons performing hot work shall be adequately trained. Every worker who as part of his or her work performs welding, burning, or cutting operations shall be a competent person.

Training must include:

- Hazards and precautions of hot work, fumes, gases & vapours including but not limited to:
- Cadmium
- Hexavalent Chromium
- Safe work practices and hot work procedures
- Position Responsibilities
- Cutters, welders and their supervisors must be suitably trained in the safe operations of their equipment and the safe use of the process
- Fire Watch Responsibilities - specifically, the fire watch must know:
- That their ONLY duty is Fire Watch.
- When they can terminate the watch.
- How to use the provided fire extinguisher(s).
- Be familiar with facilities and how to activate fire alarm, if fire is beyond the incipient stage.
- Operator Responsibilities
- Contractor Responsibilities
- Documentation requirements
- Respirator Usage requirements
- Fire Extinguisher training.

Training must be recorded. Control Tech must certify that the training has been conducted by preparing a record that includes:

- Identity of employee trained
- the signature of the person who conducted the training
- Date of the training
- Records must be kept 1 year.

24.0 HOUSEKEEPING

Effective housekeeping can eliminate some workplace hazards and help get a job done safely and properly. Poor housekeeping can frequently contribute to accidents by hiding hazards that cause injuries. If the sight of paper, debris, clutter and spills is accepted as normal, then other more serious health and safety hazards may be taken for granted.

Housekeeping is not just cleanliness. It includes keeping work areas neat and orderly; maintaining halls and floors free of slip and trip hazards; and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas. It also requires paying attention to important details such as the layout of the whole workplace, aisle marking, the adequacy of storage facilities, and maintenance. Good housekeeping is also a basic part of accident and fire prevention.

Effective housekeeping is an ongoing operation: it is not a hit-and-miss cleanup done occasionally. Periodic "panic" cleanups are costly and ineffective in reducing accidents.

24.1.1 PURPOSE OF WORKPLACE HOUSEKEEPING

Poor housekeeping can be a cause of accidents, such as:

- tripping over loose objects on floors, stairs and platforms
- being hit by falling objects
- slipping on greasy, wet or dirty surfaces
- striking against projecting, poorly stacked items or misplaced material
- cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping

To avoid these hazards, our worksites must "maintain" order throughout a workday. Although this effort requires a great deal of management and planning, the benefits are many.

24.1.2 BENEFITS OF GOOD HOUSEKEEPING

- reduced handling to ease the flow of materials
- fewer tripping and slipping accidents in clutter-free and spill-free work areas
- decreased fire hazards
- lower worker exposures to hazardous substances (e.g. dusts, vapours)
- better control of tools and materials, including inventory and supplies
- more efficient equipment cleanup and maintenance
- better hygienic conditions leading to improved health
- more effective use of space
- reduced property damage by improving preventive maintenance
- less janitorial work
- improved morale
- improved productivity (tools and materials will be easy to find)

24.1.3 HOUSEKEEPING PROGRAM

A good housekeeping program plans and manages the orderly storage and movement of materials from point of entry to exit. It includes a material flow plan to ensure minimal handling. The plan also ensures that work areas are not used as storage areas by having workers move materials to and from work areas as needed. Part of the plan could include investing in extra bins and more frequent disposal.

The costs of this investment could be offset by the elimination of repeated handling of the same material and more effective use of the workers' time. Often, ineffective or insufficient storage planning results in materials

being handled and stored in hazardous ways. Knowing the plant layout and the movement of materials throughout the workplace can help plan work procedures.

Worker training is an essential part of any good housekeeping program. Workers need to know how to work safely with the products they use. They also need to know how to protect other workers such as by posting signs (e.g., "Wet - Slippery Floor") and reporting any unusual conditions.

Housekeeping order is "maintained" not "achieved." Cleaning and organization must be done regularly, not just at the end of the shift. Integrating housekeeping into jobs can help ensure this is done. A good housekeeping program identifies and assigns responsibilities for the following:

- clean up during the shift
- day-to-day cleanup
- waste disposal
- removal of unused materials
- inspection to ensure cleanup is complete

Do not forget out-of-the-way places such as shelves, basements, sheds, and boiler rooms that would otherwise be overlooked. The orderly arrangement of operations, tools, equipment and supplies is an important part of a good housekeeping program.

The final addition to any housekeeping program is inspection. It is the only way to check for deficiencies in the program so that changes can be made. The documents on workplace inspection checklists provide a general guide and examples of checklists for inspecting offices and manufacturing facilities.

What are the elements of an effective housekeeping program?

24.1.4 DUST AND DIRT REMOVAL

Appropriate enclosures and exhaust ventilation systems to collect dust, dirt and chips adequately.

Vacuum cleaners are suitable for removing light dust and dirt. Industrial models have special fittings for cleaning walls, ceilings, ledges, machinery, and other hard-to-reach places where dust and dirt may accumulate.

Special-purpose vacuums are useful for removing hazardous substances. For example, vacuum cleaners fitted with HEPA (high efficiency particulate air) filters may be used to capture fine particles of asbestos or fibreglass.

Dampening (wetting) floors or using sweeping compounds before sweeping reduces the amount of airborne dust. The dust and grime that collect in places like shelves, piping, conduits, light fixtures, reflectors, windows, cupboards and lockers may require manual cleaning.

Compressed air should not be used for removing dust, dirt or chips from equipment or work surfaces.

24.1.5 EMPLOYEE FACILITIES

Employee facilities need to be adequate, clean and well maintained.

Lockers are necessary for storing employees' personal belongings.

Washroom facilities require cleaning once or more each shift. They also need to have a good supply of soap, towels plus disinfectants, if needed.

<u>If workers are using hazardous materials</u>

- Employee facilities should provide special precautions such as showers, washing facilities and change rooms.

- Some facilities may require two locker rooms with showers between. Using such double locker rooms allows workers to shower off workplace contaminants and prevents them from contaminating their "street clothes" by keeping their work clothes separated from the clothing that they wear home.
- Smoking, eating or drinking in the work area should be prohibited where toxic materials are handled.
- Eating area should be separate from the work area and should be cleaned properly each shift.

24.1.6 SURFACES

- Cleaning up spilled oil and other liquids at once is important.
- Clean up chips, shavings and dust so they don't accumulate. Trapping chips, shavings and dust before they reach the floor or cleaning them up regularly can prevent their accumulation.
- Areas that cannot be cleaned continuously, such as entrance ways, should have anti-slip flooring. Keeping floors in good order also means replacing any worn, ripped, or damaged flooring that poses a tripping hazard.
- Walls: Light-coloured walls reflect light while dirty or dark-coloured walls absorb light.
- Contrasting colours can warn of physical hazards and mark obstructions such as pillars.
- Paint can highlight railings, guards and other safety equipment, but should never be used as a substitute for guarding. The program should outline the regulations and standards for colours.

24.1.7 MAINTAIN LIGHT FIXTURES

- Keep light fixtures clean and replace bulbs regularly
- Clean light fixtures can improve lighting efficiency significantly while dirty light fixtures reduce essential light levels.

24.1.8 AISLES AND STAIRWAYS

- Aisles should be wide enough to accommodate people and vehicles comfortably and safely.
- Aisle space allows for the movement of people, products and materials. Warning signs and mirrors can improve sight-lines in blind corners.
- Arranging aisles properly encourages people to use them so that they do not take shortcuts through hazardous areas.
- Keeping aisles and stairways clear is important. They should not be used for temporary "overflow" or "bottleneck" storage. Stairways and aisles also require adequate lighting.

24.1.9 SPILL CONTROL

The best way to control spills is to stop them before they happen. Regularly cleaning and maintaining machines and equipment is one way. Another is to use drip pans and guards where possible spills might occur.

When spills do occur, it is important to clean them up immediately. Absorbent materials are useful for wiping up greasy, oily or other liquid spills. Used absorbents must be disposed of properly and safely.

24.1.10 TOOLS AND EQUIPMENT

Tool housekeeping is very important, whether in the tool room, on the rack, in the yard, or on the bench. Tools require suitable fixtures with marked locations to provide orderly arrangement, both in the tool room and near the work bench. Returning them promptly after use reduces the chance of being misplaced or lost. Workers should regularly inspect, clean and repair all tools and take any damaged or worn tools out of service.

24.1.11 MAINTENANCE

The maintenance of buildings and equipment may be the most important element of good housekeeping.

Maintenance involves keeping buildings, equipment and machinery in safe, efficient working order and in good repair including maintaining sanitary facilities and regularly painting and cleaning walls. Broken windows, damaged doors, defective plumbing and broken floor surfaces can make our worksites look neglected; these conditions can cause accidents and affect work practices. So it is important to replace or fix broken or damaged items as quickly as possible. A good maintenance program provides for the inspection, maintenance, upkeep and repair of tools, equipment, machines and processes.

24.1.12 WASTE DISPOSAL

- The regular collection, grading and sorting of scrap contribute to good housekeeping practices. It also makes it possible to separate materials that can be recycled from those going to waste disposal facilities.
- Allowing material to build up on the floor wastes time and energy since additional time is required for cleaning it up.
- Placing scrap containers near where the waste is produced encourages orderly waste disposal and makes collection easier.
- All waste receptacles should be clearly labelled (e.g., recyclable glass, plastic, scrap metal, etc.).

24.1.13 STORAGE

- Good organization of stored materials is essential for overcoming material storage problems whether on a temporary or permanent basis.
- Amount of handling is reduced, especially if less manual materials handling is required.
- Location of stockpiles should not interfere with work but they should still be readily available when required. Stored materials should allow at least one metre (or about three feet) of clear space under sprinkler heads.
- Stacking cartons and drums on a firm foundation and cross tying them, where necessary, reduces the chance of their movement.
- Stored materials should not obstruct aisles, stairs, exits, fire equipment, emergency eyewash fountains, emergency showers, or first aid stations.
- All storage areas should be clearly marked.
- Flammable, combustible, toxic and other hazardous materials should be stored in approved containers in designated areas that are appropriate for the different hazards that they pose.
- Storage of materials should meet all requirements specified in the fire codes and the regulations of environmental and occupational health and safety agencies in your jurisdiction

25.0 HYDROGEN SULFIDE (H2S)

25.1 PURPOSE

The purpose of this program is to establish minimum requirements for site specific H2S safety. The material in this document does not take precedence over applicable government legislation which all employees must follow.

25.2 SCOPE

This program sets forth accepted practices for Hydrogen Sulfide (H2S). This program applies to all workers of Control Tech, temporary workers, and any contractors working for Control Tech.

When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech workers and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent. If a worker is, or may be, exposed to H2S Control Tech must conduct monitoring of the substance on a regular basis.

25.3 WORKER EXPOSURE TO H2S

The potential for worker exposure to H2S will be identified during the hazard assessment conducted by Control Tech. Control Tech must ensure that a worker's exposure to H2S is kept as low as reasonably achievable. Workers must not be exposed to airborne concentrations of H2S that exceeds 10 ppm at any time. Atmospheric testing results will be assessed before a worker is exposed.

Control Tech must ensure that workers who may be exposed to H2S gas are able to recognize its lethal effects. Procedures must be in place for activities where H2S may be present as well as to ensure that victims who are overcome are rescued and given first aid.

25.4 RESPONSIBILITIES

Managers and Supervisors

- Shall ensure all workers who are to be assigned to work at locations where hydrogen sulfide is known to be present, or suspected to be present in any concentration, have been trained in hydrogen sulfide safety.
- To ensure workers have been medically approved to wear respirators and trained on the safe use of respirators, including a respirator fit test in accordance with the Control Tech Respiratory Protection Program.
- To ensure workers have been trained and familiar with personal H2S monitors and gas detection instruments.
- To have been provided with the client's safety procedures.
- To ensure the necessary respiratory equipment to perform the work safely is available.
- That each worker has been provided with a copy of this program.
- The Control Tech safety manager is responsible for the code of practice preparation, the manager and supervisors for enforcement and all staff are responsible for following its guidelines and requirements.

Workers

- When workers must wear personal protective equipment, they must use the appropriate equipment. They must not use personal protective equipment that is not in a condition to perform the function for which it was designed.
- Workers with equipment under their control that does not comply with the OHS Code must remove that equipment from service.
- Workers must be aware of the "Code of Practice" developed for jobs involving confined space entry and must not enter or remain in a confined space if control measures are not in place.
- Workers must participate in training programs provided by Control Tech
- Workers are responsible to comply with this program.

25.5 GENERAL INFORMATION - H_2S

25.5.1 PHYSICAL EFFECTS OF HYDROGEN SULFIDE

H2S paralyzes the sense of smell. Do Not Rely on Smell To Detect H2S – Rely Strictly on Instruments Designed To Measure Concentrations of H2s.

Hydrogen sulfide is a very dangerous and deadly gas: it is colorless and heavier than air and water soluble.

It is flammable and can explode in a 4.3 to 46.0 percent by volume concentration.

It can accumulate in low places and in small concentrations it has a strong, pungent, somewhat distasteful odour similar to rotten eggs. In higher concentrations, it can deaden the sense of smell (olfactory nerve).

25.5.2 PLACES WHERE H2S IS FOUND

- Gas Plants, refineries, petro-chemical plants, Sulphur recovery plants
- Underground mines
- Tank cars, tank trucks
- Oil and gas wells, battery stations
- Commercial laboratories
- Septic tanks, sewers, manure handling areas
- Pulp and paper mills
- Pipelines

25.5.3 TOXIC EFFECTS OF HYDROGEN SULFIDE

CONCENTRATION	PHYSICAL EFFECT
.01 PPM	Can smell odour.
10 PPM	Obvious and unpleasant odour. Beginning eye irritation. Permissible exposure level for 8 hours. British Columbia's Occupational Exposure Limit (OEL).
15 PPM	Ceiling OEL. An unprotected worker may not be exposed above this concentration.
20 PPM	Severe eye irritation. Nose, throat and lung irritation. Loss of appetite.
100 -200 PPM	Severe nose, throat and lung irritation. Ability to smell odour completely disappears (150 ppm).
500 PPM	Severe lung irritation, headaches, dizziness, staggering, collapse.
500-1000 PPM	Respiratory paralysis, irregular heartbeat, collapse or death.

25.6 CODES OF PRACTICE

Control Tech must ensure that no worker is exposed to H2S that exceeds the ceiling limit of 10 ppm.

A code of practice is required for work sites where there may be more than 10 ppm of hydrogen sulphide present and shall govern the storage, handling, use and disposal of H2S if there is a potential for exposure. Control Tech must develop a written procedure that meets legislative requirements in the province in which they are working. The site specific code of practice will include:

- Control Tech policy and persons responsible for the code of practice
- Control measures to prevent worker exposure to H2S, and procedures to be followed in the event of an uncontrolled release of H2S. The program must include control measures to prevent worker exposure to H2S and the procedures to be followed if there is an uncontrolled release.
- Safe work procedures to be followed in the event of an uncontrolled release of H2S (evacuate, alarm, assess, protect, rescue, revive and medical aid)
- Required personal protective equipment
- Worker training requirements
- Emergency procedures and designated emergency personnel.

A written procedure must identify the substances to which a worker may be exposed, the conditions under which a worker will be required or permitted to work, including the frequency, quantity and duration of exposure to the substances and the steps that Control Tech will take.

25.7 SAFE WORK PROCEDURES

1. Maintain compliance with permit requirements of Control Tech and any requirements by the client.
2. Verify that proper safety equipment is available, functioning properly and is utilized.
3. Check and remain aware of wind conditions and direction.
4. Perform a thorough check of the downwind area prior to the start of any potentially hazardous work activity.
5. Check for other personnel and ignition sources.
6. Ventilate work areas by venting and purging lines and vessels prior to beginning any work activities.
7. Keep all non-essential personnel away from work areas.
8. Each person entering a H2S designated location, regardless of the concentration, shall wear a personal H2S monitor that is set to alarm at 10 PPM and shall carry a 5-minute escape pack with them at all times.
9. Immediately vacate the area when any H2S monitor sounds.

25.7.1 ASSESSMENT

<u>If a worker is or may be exposed to H2S, Control Tech must ensure that:</u>

- a walkthrough survey is conducted to assess the potential for overexposure taking into account inhalation, and
- reassessment is conducted when there is a change in work conditions which may increase the exposure, such as a change in production rate, process or equipment

If the walkthrough survey reveals that a worker may be at risk of overexposure to H2S, Control Tech must ensure that air sampling is conducted to assess the potential for overexposure.

25.7.2 EQUIPMENT

The following equipment shall be provided and used as required by this program:

- Personal H2S monitor set to alarm at permissible exposure limit of 10 PPM. Fixed monitors may be present as well at the same alarm setting.
- Portable H2S gas testing instrument, either electronic or manual pump operated, capable of testing the suspected concentrations of H2S in the system.
- Each testing instrument must be capable of testing the suspected concentrations of H2S by using the manufacturer's recommended calibrated tube or other means of measuring the concentration of gas.
- Testing instruments shall be calibrated periodically according to the manufacturer's recommendation, and at least annually.
- Calibration kits with regulator for calibrating the personal monitor.
- Calibration gas cylinder for testing the personal monitor.
- Respiratory protective equipment is provided, where necessary, to protect employees from H2S.
- If a worker is or might be exposed to a concentration of H2S that exceeds its ceiling limit, Control Tech must provide an appropriate respirator and ensure that the worker uses it.
- The use of personal protective equipment as the primary means to control exposure is permitted only when:
    - substitution, or engineering or administrative controls are not practicable, or
    - additional protection is required because engineering or
    - administrative controls are insufficient to reduce exposure below the applicable exposure limits, or
    - the exposure results from temporary or emergency conditions only.
- The use of personal protective equipment as the primary means to control exposure is permitted only when:
- substitution, or engineering or administrative controls are not practicable, or
- additional protection is required because engineering or administrative controls are insufficient to reduce exposure below the applicable exposure limits, or
- the exposure results from temporary or emergency conditions only
- Respirator wearers requiring corrective eyewear will be fitted with spectacle kits according to the respirator manufacturer, at no expense to the worker.
- Respirators and their components, including all fittings of hoses, shall not be interchanged, which if done, would violate the approval rating of said respirator or related equipment.

25.7.3 MONITORS AND GAS DETECTOR CALIBRATION

Each personal H2S monitor shall be calibrated at least monthly and the results recorded on the calibration log.

Those monitors that do not require calibrating shall be bump checked with calibration gas to test alarms, monthly or prior to use if not used routinely.

25.7.4 REQUIRED PERSONAL PROTECTIVE EQUIPMENT

Each respirator wearer will complete respiratory protection training and a respirator fit test, after being given a medical clearance and before entering any H2S location.

Respirator Inspections

Respirators will be inspected by the worker before each use and at least monthly.

The inspection will include the respirator face piece, hose, harness, 5 minute escape pack cylinder and all other components of the air supply systems used.

Monthly inspections will be documented as per Control Tech Respiratory Protection Program, and will be kept on file at the local office for review during safety audits.

25.8 EDUCATION AND TRAINING FOR WORKERS

Workers are provided training on the hazards of H2S and safe work procedures. If a worker is or may be exposed to H2S, the employer must ensure that its possible effects on worker health and safety, and any precautions required to protect the health and safety of the worker, are clearly communicated to the worker. Control Tech must ensure that the supervisor and the worker are trained in and follow the emergency procedures.

All employees that are exposed to airborne concentrations undergo training applicable to the authority having jurisdiction. This includes site supervisors/superintendents who oversee other contractors performing this function. Control Tech will ensure that a worker who may be exposed to H2S is informed of the health hazards associated with exposure to that substance, is informed of measurements made of airborne concentrations of harmful substances at the work site and is trained in procedures developed by Control Tech to minimize the worker's exposure.

Training shall consist of:

- General characteristics
- Sources of H2S & Locations H2S could be encountered in activities
- Control measures
- Human physiology
- Health hazards associated with exposure to H2S, signs and symptoms of H2S exposure, acute and chronic toxicity
- Symptomatology of H2S exposure
- Medical evaluation
- Work procedures
- Personal protective equipment required working around H2S
- Use of contingency plans and emergency response and procedures developed to minimize the worker's exposure.
- Regulatory requirements
- Rescue techniques, first aid, and post exposure evaluation
- Use, care, and calibration of personal monitors and gas detection instruments and concentrations of harmful substances at the work site
- Respirator inspections and record keeping

25.9 MEDICAL

Each worker shall have completed a medical evaluation by a physician or licensed health care professional to determine the worker's ability to wear a respirator as required by the Control Tech Respiratory Protection Program.

Each worker will successfully complete the medical questionnaire and examination before being allowed to be fit tested with a respirator.

25.10 PROCEDURES TO BE FOLLOWED IN THE EVENT OF AN H2S RELEASE

1 **Notify workers**		Notify workers of the nature and location of the emergency
2 **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
3 **Assess Situation**		Do a head count Consider other hazards
4 **Protect Yourself**		Put on breathing apparatus before attempting rescue
5 **Rescue Others**		Remove victim to a safe area
6 **Notify Responders**		Notify emergency responders Arrange transport of victim to medical aid if required Provide information to Emergency Medical Services (EMS)
7 **Revive Victim**		Apply CPR if necessary

Adapted from Gov.of AB "H2S The Killer"

26.0 JOURNEY MANAGEMENT

26.1 PURPOSE

The purpose of this program is to minimize or eliminate driving related incidents that bring harm to people and property. Control Tech can minimize injury and damage by identifying and managing hazards and minimizing exposure to unnecessary travel. The success of our journey management program requires a commitment from everyone.

26.2 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the journey management program and related procedures.

Site Manager/Dispatcher

- Implementation and maintenance of the journey management program for their site and ensuring all assets are made available for compliance with the program.

Employees

- Be familiar with this program and the local workplace vehicle safety program.
- Ensure another individual is aware of your trip itinerary. Employees should notify their supervisor or another individual who is not traveling with them of their travel plans. This includes where they are going, when they should be getting there and when they plan to return.
- Drivers must carry a reliable method of communication (cell phones, CB radio, etc.) in case of emergency. Drivers should always carry a cell phone, especially when traveling in rural areas. Consider subscribing to an in-vehicle communication/ remote diagnostic service (e.g. On-Star) if the vehicle is equipped with one.
- Report unsafe conditions, and follow all requirements.

26.3 LEGISLATION

The OHS legislation provides the framework and defines the responsibilities for Control Tech, workers and supervisors to work safely and follow safe work practices. Applicable legislation includes:

- OHS Code Part 28 Working alone
- OHS Code Part 19 Powered mobile equipment
- Traffic Safety Act

Commonly referred to as the “General Duty Clause”, federal, provincial and territorial regulations in Canada have similar occupational health and safety legislation that describes the obligations.

“Everyone who undertakes, or has the authority, to direct how another person does work or performs a task is under a legal duty to take steps to prevent bodily harm to that person, or any other person, arising from that work or task.”

26.4 TRAINING

Workers are provided training on the Journey Management Plan. The Journey Management Plan or Dispatch Sheet is reviewed with drivers before they perform any driving on company business. A copy of the plan must be readily available to drivers. A copy of the plan is carried in the vehicle.

26.5 DEFINITIONS

Trip: short travel periods

Journey: usually involves long distances over a period of time or consists of one or more trips.

Journey management is a planned and systematic strategy to reduce transportation-related risks within a company's operations.

Trip management is the day-to-day process drivers and supervisors follow to minimize risk for necessary trips. Trip management is a part of journey management.

26.6 JOURNEY MANAGEMENT PLAN

The Journey Management Plan should include the following:

Trip Plan – Plans will help to identify hazards across the company's operating locations. The journey manager (dispatcher or transport manager) will plan the trip including planning the route, securing permits if necessary, deciding which drivers will go (available hours, fitness for duty, proper licensing, etc.), alerting the drivers to confirm availability, assess hazards - checking current weather conditions, checking current road conditions, refuelling points, rest stops, length of time it will take, work alone requirements, etc.

Plan Review – A pre-trip briefing should be conducted between driver and journey manager (dispatcher/transport manager) Review of the plan to discuss details of the trip plan. Personnel must fully understand the details documented in the plan. Should ensure the driver is qualified and fit for duty and the vehicles are in safe working condition and of proper configuration for job, with all required safety equipment / devices.

Trip Preparation – drivers will get confirm route & get directions if required, check-in times, permitting requirements, (have permits been received?), completing trip inspections, refueling, rechecking weather and road conditions, ensuring TDG documentation is in order (if applicable)

Trip – ensure check-in times are followed, communication of any issues. Communicate any unplanned deviations from the plan. The journey manager is informed when the vehicle arrives at the destination. The journey manager should be informed of any delays from the planned arrival to appropriately respond.

Trip Completion– De-brief following the trip including but not limited to defects found on unit, any problems or issues encountered such as incidents, government inspections, cycle hours left to use, etc.

26.6.1 TRIP HAZARD ASSESSMENT

Trip hazard assessment is to be completed during the planning stages. An assessment must include:

- Assessment date
- Assessor
- Start point
- End point
- Communication methods including contact details
- Number of vehicles
- Number of passengers
- Inspections

The hazard assessment is used to capture specific details of the hazards, as well as the corresponding controls. The assessment should include details such as:

- Hazard location (mile marker, GPS coordinates)
- Risk level (ranking)

- Availability of phone service/correct two-way radio frequency, etc.
- Hazard detail (e.g. Freeze thaw conditions impacted by daylight or darkness, construction, weather/road/visibility conditions)
- Controls
- Comments

26.6.2 SOME OF THE HAZARDS TO CONSIDERED

Road Considerations

- Unclear route (should be clearly defined and mapped)
- Speed limits (regulatory and company/client policy based)
- Road conditions e.g. Unpaved, loose packed gravel, poor drainage, frequent mud, over-graded shoulders, frost heaving, runoff, etc.
- Other road users: recreational (campers, cyclists, atv's), work operations (over dimension loads, logging trucks, farming operations), school areas (children)
- Weather conditions
- Light e.g. Day, night, dusk, etc.
- Consideration for wildlife movement
- Temperature
- Road directions and detail
- Hazardous areas e.g. Intersections, crossings, merging lanes, road work projects, speed changes, weight restrictions on roads / bridges
- Obstructions, low clearance
- Railroad crossings (more information available at: www.operationlifesaver.ca)

Driver Considerations

- Qualifications (training) - ensure drivers are qualified for the trip
- Competency – do the driver's skills match the assigned task? (e.g. Towing a trailer, travel off-highway)
- Working Alone – does the driver know the work alone check-in requirements (to ensure contact with drivers & location of drivers are known).
- Experience
- Additional requirements for commercial versus non-commercial drivers
- Contractor / third party requirements
- Conflicting priorities e.g. Crew change, client demands, job deadlines, personal schedules
- Fit for duty - consider possible alcohol or drug impairment, fatigue, low alertness, sickness and health

Vehicle Considerations

- Whether the vehicle been serviced and inspected
- Traction conditions – controls may include 4 wheel drive, tire chains and winter tires
- Trailer towing – although "rated" to tow, is the tow vehicle of appropriate size and properly equipped (brake control, hitch) to handle a trailer in these conditions? (steep grades, off-highway)
- Whether the vehicle will be required to carry cargo or passengers
- Does the vehicle have the proper communications equipment and frequencies for the area of travel? (gps, two-way radio, satellite phone)
- Is the vehicle equipped to respond to an emergency or mechanical breakdown? (e.g. First aid kit, survival gear, tow device, booster cables, reflector devices)

Environmental Considerations

- Weather – near freezing temperatures, rain pooling on roads, strong / gusting crosswinds, shadowed areas slow to thaw, known snow drifting locations
- Visibility – low light conditions, rain, fog, smoke, blowing snow

- Traffic
- Security risks
- Animal activity
- Current road conditions – snow, ice, wet surface, ruts, mud, potholes

26.6.3 CONTROLS FOR HAZARDS DURING TRIPS

- A copy of the plan must be readily available at the workplace. Road travelers should carry a copy of the plan.
- Driving directions shall be obtained before traveling to an unfamiliar destination. Before taking a trip to an unfamiliar location each employee will ensure they have printed driving directions available.
- Do not plan to read directions from a smartphone while driving.
- A GPS device may be used, but printed directions should be available.
- Road travel should be limited whenever practicable (e.g. combining trips, identifying if trips are necessary for a job, etc.)
- Road journeys should only be taken when necessary. Multiple tasks should be planned in single trips to reduce the amount of driving for improved safety and efficiency.
- If the trip is being taken to meet with someone, determine if the meeting can be done over the phone instead.
- Safer methods of travel (air, train, etc.) should be considered where practicable.
- Driving during adverse weather conditions should be avoided, whenever practicable. Always check weather and road conditions (in winter) before leaving. Follow traffic safety legislation when it comes to traveling in bad weather. See SECTION 40.4, ADVERSE WEATHER CONDITIONS for guidelines.
- Ensure the vehicle being used is adequate for the weather conditions.
- Vehicles are equipped with roadside emergency kits. Make sure emergency supplies are in the vehicle, and the driver has a cell phone in case of emergency.
- The emergency kits should include equipment to assist in a roadside emergency such as water, booster cables, first aid supplies, blankets, warning triangles, flashlights, etc. In winter months, carry a shovel and sandbags in light duty vehicles.

<u>Work Alone Program Requirements</u>

- Driver should notify their supervisor or another individual who is designated as work alone contact, and who is not traveling with them, of their travel plans. This includes where they are going, when they should be getting there, and when they plan to return.
- Check in at your pre-scheduled times if driving alone.
- Drivers must carry a reliable method of communication (cell phones, CB radio, etc.) in case of an emergency.

<u>Employees driving vehicles are required to follow safe driving practices:</u>

- Obey all federal and local driving laws or regulations as well as requirements of clients
- Road travel should be completed during daylight hours. Driving should be done during daylight hours rather than after dark whenever possible. Reduce speed when driving at night. Be aware of the potential for wildlife to be on the road, especially when driving at dusk or dawn.
- Immediately report any citation, warning, traffic violation, collision, vehicle damage or near miss associated with company or client vehicle operation or while driving on company duties to the supervisor or dispatcher
- Know the emergency response procedures
    - Who to call and their phone numbers
    - emergency radio channel/frequency in remote areas
    - location and contact information for nearest medical facility (hospital, camp medic)
    - location of survival kit and emergency equipment

  - alternate locations enroute for fuel, accommodations or assistance in case of mechanical problems
- Immediately report any restriction or change to their driving privileges to the supervisor.
- Seat belts shall always be worn by all occupants whenever the vehicle is in motion
- Defensive drivers continually assess conditions and hazards and remain prepared for any challenge that may approach them
- Take periodic rest breaks to reduce fatigue(cargo and equipment checks, refueling)
- When speaking with a passenger, always keep your eyes on the road
- Both hands on the wheel
- No use of cell phones, radios or other electronic devices while driving any vehicle - vehicle must be safely parked prior to using a mobile phone or 2-way radio.
- Slow down around construction, large vehicles, wildlife, fog, rain, snow, or anything else that adds a hazard to your driving
- Drive for conditions, not just the speed limit
- Alcohol or illegal drugs are not allowed to be in a company, client or leased vehicle at any time
- Drivers shall not operate a motor vehicle while under the influence of alcohol, illegal drugs, or prescription or over-the counter medications that might impair their driving skills.
- Operators of Control Tech or client on or off road vehicles shall be qualified by possession of a valid, current driver's license for the type of vehicle being driven.
- Only authorized employees will drive a motor vehicle in the course and scope of work or operate a company owned vehicle.
- Backing is prohibited whenever practicable. Where backing is required, drivers, when parking, should make every effort to park the vehicle in a manner that allows the first move when leaving the parking space to be forward.
- Drivers must have either a reversing alarm, use a spotter or walk around the truck/trailer prior to backing.
- Passenger compartments are to be free from loose objects that might endanger passengers in the event of an incident. Any vehicle with non-segregated storage shall be equipped with a cargo net or equivalent to separate the storage area.
- Signs, stickers or labels are to be fitted in such a manner that they do not obstruct the driver's vision or impede the driver's use of any controls.

<u>Drivers are to be prepared before leaving:</u>

- Perform 360 walk around – report new damage;
- Check windshield for cracks that could interfere with vision;
- Inspect for vehicle damage and immediately report any damage to the supervisor if not previously observed;
- Make sure dirt or snow is removed from lights on all sides of the vehicle;
- Brush or clean off snow or ice on all windows to ensure complete vision;
- Check fuel level to be certain the destination can be reached;
- Check to ensure the license plates and inspection tag on vehicle are current;
- Ensure that there is a first aid kit and inspected fire extinguisher in the company vehicle;
- Ensure the driver is rested and alert for driving;
- Employees are not to perform repairs or maintenance other than routine fluid additions.

<u>Vehicle Requirements</u>

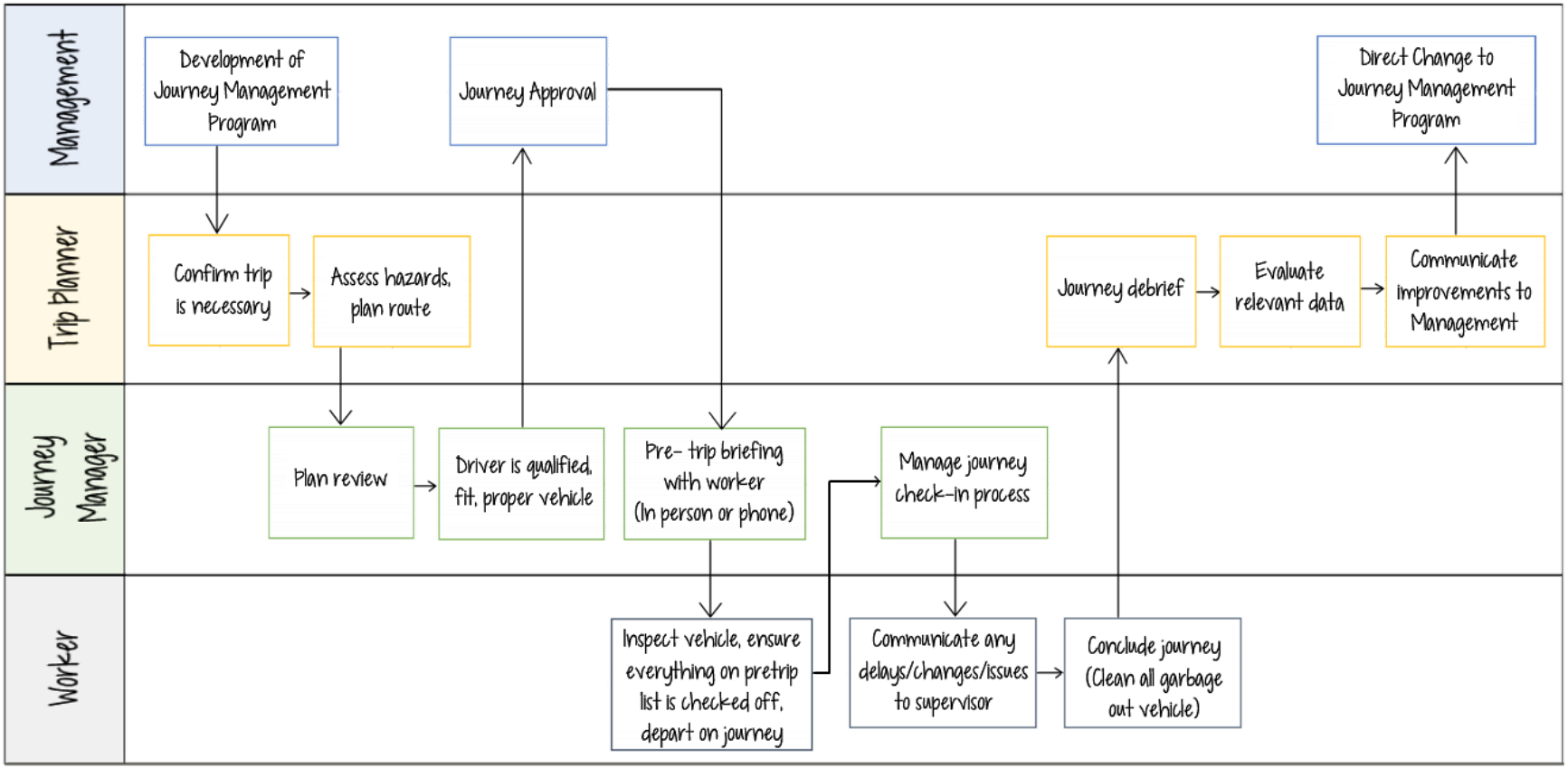
- All vehicles shall be fit for the purpose, and shall be maintained in safe working order.
- Tire type and pattern is to be recommended by the vehicle or tire manufacturer for use on the vehicle in the area of operation.
- Vehicles are to be fitted with a spare wheel and changing equipment to safely change a wheel, or a suitable alternative.

- Loads shall be secure and shall not exceed the manufacturer's specifications and legal limits for the vehicle.
- Vehicles are equipped with roadside emergency kits. Roadside emergency kits should be kept in all vehicles used for highway travel. These kits shall include equipment to assist in a roadside emergency such as water, booster cables, first aid supplies, warning triangles, flashlights, etc. If there is a potential for snow and ice, carry sandbags and a shovel.
- All vehicles are to be equipped with a multipurpose fire extinguisher with a capacity of at least 0.9 kg/2 lb. The fire extinguisher shall be securely mounted on a bracket and located so that it is easily accessible in an emergency without becoming a hazard in case of an incident.
- There must be a first aid kit in all units which is easily accessible at all times
- All drivers shall carry a high visibility jacket for use in case of emergency stops.
- All light duty vehicles carry a minimum of one collapsible hazard warning triangle.

26.6.4 REVIEW

The Journey Management program is reviewed every three years unless an incident occurs or deficiencies are found in the program. If an incident occurs a review will be completed as part of the investigation required actions. If deficiencies are found in the program it will be altered to reflect requirements.

26.7 JOURNEY MANAGEMENT RESPONSIBILITY FLOW



Edited from: Enform Journey Management Program Development Guide

27.0 LADDER SAFETY

27.1 PURPOSE

The purpose of the program is to prescribe rules and establish minimum requirements for the construction, care, and use of the common types of ladders. All ladders that are purchased and placed into service; or, any ladders that are engineered, manufactured and installed on any Control Tech equipment shall follow the requirements set forth by this program. The material in this document does not take precedence over applicable government legislation which all workers must follow.

27.2 SCOPE

This program is applicable to all workers who may utilize ladders. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech workers and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

27.3 RESPONSIBILITIES

Managers and Supervisors

- Managers and supervisors are responsible for ensuring that all workers, and/or contractors have been trained in the use and inspection of ladders in accordance to the manufactures guidelines.
- Managers and supervisors are responsible for ensuring that all workers and contractors are aware that if an inspection discovers a defect, the ladder shall not be used and taken out of service.

Workers

- Workers shall inspect ladders prior, during and at the completion of each use to ensure the condition of the ladder and the safety of its occupants.
- Workers are responsible for following this program and reporting any damage or repairs that may be needed to their supervisor.

27.4 TRAINING

All workers will be trained in safe inspections, care and use of ladder prior to using a ladder.

27.5 TYPES OF LADDERS

- Portable ladders
- Step ladders
- Extension Ladders
- Fixed ladders

27.6 PROCEDURES

Ladders should not be used if a safer means of accessing an elevated work area is available. Control Tech shall ensure that workers do not use a ladder to enter or leave an elevated or sub-level work area if the area has another safe and recognizable way to enter or leave it. If work cannot be done from a ladder without hazard to a worker, a work platform must be provided. A worker must not carry up or down a ladder, heavy or bulky objects or any other objects which may make ascent or descent unsafe.

27.6.1 INSPECTION, CARE AND SAFE WORK PRACTICES OF LADDERS

Inspection

Ladders are inspected before use and defective ladders are removed from service. A ladder must be inspected before use on each shift, after any modification and any condition that might endanger workers must be remedied before the equipment is used.

Reject and tag (tagged or marked as "Dangerous, Do Not Use) any ladders that have defects. Have faulty ladders repaired or thrown out.

Ladder rungs, cleats and steps shall be parallel, level and uniformly spaced.

Portable ladders shall be CSA certified. Control Tech must ensure that a portable ladder meets the requirements of CSA Standard CAN3-Z11-M81 (R2005), Portable Ladders. The applicable ANSI Standard is also acceptable (managers can refer to the Provincial Occupational Health and Safety (OHS) Code/regulations for details for the province in which they are working).

Portable single or extension ladders shall be equipped with a non-slip type base or shall be held, tied or otherwise secured to prevent slipping.

If a ladder is tipped over, it shall be inspected by a competent person for side rail dents or bends, or excessively dented rungs; check all rung to side rail connections; check hardware connections; check rivets for shears.

Ladders with loose, broken or missing rungs, split side rails or other hazard producing defects shall not be used. Improvised repairs shall not be made.

All wood parts shall be free from sharp edges and splinters; sound and free from accepted visual inspection from shake, or other irregularities. Wooden ladders must not be painted.

Care

Ladders shall be maintained in good condition at all times, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate freely without binding or undue play.

Metal bearings of locks, wheels, pulleys, etc., shall be frequently lubricated.

Frayed or badly worn rope shall be replaced. Safety feet and other auxiliary equipment shall be kept in good condition to ensure proper performance.

Rungs shall be kept free of grease and oil.

27.6.2 STORAGE

- Ladders shall be stored where they are protected from the weather in a well-ventilated area in a manner to prevent sagging and warping.
- Return ladders to storage area after use.
- Support ladders horizontally on racks. To prevent sagging, support ladders every 2 m (6 ft.).
- Keep ladders clean and free of foreign materials.
- Ensure that storage areas are easy to reach.
- Keep wooden ladders in a well-ventilated location, away from dampness and excessive heat.
- Avoid long overhangs beyond support points when transporting ladders on vehicles.
- Pad racks on vehicles with soft material to reduce wear and road shocks.
- Tie ladders to each support point to reduce damage.
- Do not hang ladders from rails or rungs.
- Do not store materials on ladders.

- Do not expose fiberglass ladders to excessive temperatures (above 93°C or 200°F).

27.6.3 CARRYING AND TRANSPORT OF LADDERS

- Mark ladders which overhang vehicles with a red or orange flag.
- Get help when handling a heavy or long ladder.
- Grasp ladders near the centre when carrying them.
- Use caution when carrying ladders through passageways, doorways or any place where your view is obstructed.
- Set up suitable barriers or lock doors shut if using ladders in passageways, doorways, driveways or other locations where a person or vehicle can hit it.
- Use a partner to help carry long or heavy ladders.
- Ensure that you and your partner are on the same side when carrying a ladder. Stay in step. Work out in advance any hand or voice signals to coordinate stopping or changing direction.
- Do not hold the front of ladders at head level when carrying them.
- Do not expose plastic-reinforced ladders to excessive sunlight. Ultraviolet light may cause the plastic resins to degrade. If the strength of the ladder is questionable, replace the ladder.

27.6.4 SAFE WORK PRACTICES – GENERAL USE OF ALL LADDERS

- Use a ladder designed for your task. Consider the strength, type, length and the Canadian Standards Association (CSA) approval.
- Ladders shall be used only for the intended purpose for which they were designed.
- Do not overreach. Move a ladder when needed.
- Place the ladder on a firm, level ground.
- Do not use ladders near electrical wire unless you have been trained to do so and you have permission from authorized personnel and then the following must be adhered to: Ladders used when servicing energized electrical equipment must be non-conductive. Control Tech shall ensure that a ladder used during the servicing of energized or potentially energized electrical equipment is made of non-conductive material. Metal ladders or wire reinforced wooden ladders shall not be used in proximity to energized electrical equipment.

- Set up barricades and warning signs when using a ladder in a doorway or passageway.
- The worker shall maintain a three (3)-point grip on the ladder at all times keeping the centre of your body within the side rails.
- Carry tools/equipment on a belt or hoist up. Do not carry anything in the hands that could cause injury in case of fall.
- The worker shall face the ladder while ascending or descending.
- Do not use ladders on ice, snow or other slippery surfaces without securing ladders' feet.
- Do not extend top section of a ladder from above or by "bouncing" on a ladder.
- Do not leave ladders unattended.
- Avoid climbing with wet soles
- Do not carry tools or materials in your hand while climbing. Carry small tools in a tool pouch.
- Do not jump from a ladder. Check footing before descending a ladder.
- Do not hurry up or slide down a ladder.

27.6.5 SAFE WORK PRACTICES – USE OF PORTABLE LADDERS

- Portable ladders are placed against the top support at a minimum 4:1 incline. A ladder must be positioned so that the horizontal distance from the base to vertical plane of support is approximately ¼ of the ladder length.
- Brace or tie the bottom of the ladder.
- Rest both side rails on the top support and secure ladder to prevent slipping.
- Portable ladders in use are secured against movement and placed on a stable base. A ladder must be placed on a firm and level base and secured to ensure stability during use.
- Ladders shall not be placed on boxes, barrels, or other unstable bases to obtain additional height.
- No ladder shall be connected to another ladder to increase its length.
- Do not use a ladder in a horizontal position as a scaffold plank or runway.
- Ladders shall not be used by more than one worker at a time.
- Keep ladders away from electrical wires.
- The upper supports of ladders used to access elevated work areas must extend a minimum of one metre above the elevated surface. A ladder must have sufficient length to project approximately 1 m (3 ft.) above the upper landing to which it provides access.
- Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.
- Tie off ladders at the top and secure bottom to prevent them from slipping.
- Before mounting a ladder, clean the boot soles if they are muddy or slippery.
- Performing work from the top two rungs of a portable ladder is prohibited. A worker must not perform work from either of the top two rungs, steps, or cleats of a portable ladder unless the manufacturer's specifications allow the worker to do so.
- The ladder shall not be moved while occupied.
- Do not overreach. Move a ladder when needed.

27.6.6 SAFE WORK PRACTICES – USE OF EXTENSION LADDER

- If an extension ladder is used by a worker is must be equipped with locks that securely hold the sections of the ladder in the extended position.
- Place ladders on a firm, level surface and ensure the footing is secure.
- Erect extension ladders so that the upper section rests on (e.g., in front of) the bottom section. This means the bottom section "faces" a wall or other supporting surface (see figures below).
- Place the ladder feet so that the horizontal distance between the feet and the top support is 1/4 of the working length of the ladder. The ladder will be leaning at a 75 degree angle from the ground.
- Raise and lower ladders from the ground. Ensure that locking ladder hooks are secure before climbing.
- Erect ladders so that a minimum of 1 m (3 ft.) extends above a landing platform. Tie the top at support points.
- Brace or tie off the ladder near the base. If there is no structure to tie off to, use a stake in the ground.
- Leave all tie-off devices in place until they must be removed before taking the ladder down.
- Maintain the minimum overlap of sections as shown on a ladder label. Refer to safety regulations.
- Do not set up or take a ladder down when it is extended.
- Do not overextend. Maintain minimum overlap of sections.
- Do not climb higher than the fourth rung from the top of a ladder.
- When working 3 metres (10 feet) or more above ground, wear a safety belt or harness with the lanyard tied appropriately to the structure.

When setting up an extension ladder, use the following method to avoid straining muscles or losing control of a ladder. With ladders weighing more than 25 kg (55 lb), or where conditions complicate the task, have two persons set up a ladder, step by step, as follows:

1. Lay a ladder on the ground close to intended location.
2. Brace ladder base using helpers' feet.
3. Grasp the top rung with both hands, raise the top end over your head and walk toward the base of a ladder. Grasp the centre of the rungs to maintain stability.
4. Move the erect ladder to the desired location. Lean it forward against the resting point.

<u>One person can erect a short ladder, step by step as follows:</u>

1. Place the bottom of a ladder firmly against the base of a building or stationary object.
2. Lift the top of ladder, and pull upwards to raise a ladder to a vertical position.
3. Transfer a ladder to its required position when it is erect.
4. Keep a ladder upright and close to the body with a firm grip.

Lowering a ladder is the reverse procedure of erecting it.

27.6.7 SAFE WORK PRACTICES – USE OF STEP LADDER

- Use a stepladder that is about 1 m (3 ft.) shorter than the highest point you have to reach. This gives a wider, more stable base and places shelf at a convenient working height.
- Open the stepladder spreaders and shelf fully.
- Check stability. Ensure that all ladder feet are on a firm, level and non-slippery surface.
- Place a stepladder at right angles to the work, with either the front or back of the steps facing the work.
- Keep the stepladder close to the work.
- The bracing on the back legs of stepladders is designed solely for increasing stability and not for climbing.
- Avoid pushing or pulling stepladders from the side. Repeated sideways movement can make ladders wobbly since they are weaker or less stable in those directions.
- Face the stepladder when climbing up or down. Keep your body centered between side rails. You have climbed too high if your knees are above top of the stepladder or if you cannot maintain a handhold on the ladder.

- Only 1 person is allowed on a ladder at one time.
- Maintain a firm grip. Use both hands when climbing.
- Do not "shift" or "walk" a stepladder when standing on it.
- Do not stand, climb, or sit on the stepladder top or pail shelf.
- Do not use a stepladder as a brace or as a support for a work platform or plank.
- Do not climb a stepladder that is leaning against a wall. Use a straight ladder instead.
- Do not use stepladders on slippery surfaces
- Do not use stepladders on soft ground where one leg may sink farther into the ground than others.
- Do not place stepladders on boxes, unstable bases or on scaffolds to gain additional height.
- Do not climb the back of a stepladder.
- Do not push or pull stepladders sideways.

27.6.8 SAFE WORK PRACTICES – USE OF FIXED LADDERS

Inspections:

Inspect the fixed ladder before each use. Checking for:

- loose, worn and damaged rungs or side rails
- damaged or a corroded cage
- corroded guard, bolts and rivet heads
- damaged or corroded handrails and brackets on platforms
- broken or loose anchorages
- weakened or damaged rungs on brick or concrete slabs
- defects in climbing devices, including loose or damaged carrier rails or ropes
- slippery surfaces from oil and ice
- clutter obstructing the base of ladder or platform

Inspect fixed ladders periodically, at least annually. Inspections may be required more frequently depending on the organization's requirements or the exposure of the ladder to elements such as weather or salt air.

Defects must be reported immediately to supervisor.

Record of every inspection must be kept.

Use of ladder

- No more than 1 person ascending or descending at a time on the ladder.
- Use the appropriate safety devices (e.g., restraint belt, traveling fixture).
- Maintain three-point contact by keeping two hands and one foot, or two feet and one hand on a ladder always.
- Face ladder and use both hands to grip the rungs firmly.
- Place feet firmly on each rung.
- Wear footwear with heels. Ensure that footwear is in good condition.
- Clean muddy or slippery boot soles before mounting a ladder.
- Rise or lower tools and materials using a hand-line.

28.0 LOCKOUT TAGOUT

28.1 PURPOSE

The purpose of this program is to establish procedures for eliminating or minimizing the occurrence of unexpected energization or start-up of machinery or equipment or the unexpected release of an energy source that could cause injury. The energy source must be isolated and effectively controlled.

For affixing appropriate lockout/tagout equipment to energy isolating devices and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy to prevent injury or incident. The material in this document does not take precedence over applicable government legislation which all employees must follow.

28.2 SCOPE

This program covers the servicing and maintenance of machines and equipment where the unexpected energization or start-up of the machine or equipment, or the release of stored energy could cause an incident. This program establishes minimum performance requirements for the control of such hazardous energy.

28.3 RESPONSIBILITIES

Company

- Is responsible for establishing the lockout system to be implemented within the worksite.
- Ensure that managers, supervisors and workers understand and use a well-established lockout system.
- Procedures for lockout must be written.
- Each personal lock must be marked or tagged to identify the person who applies it. For example, the worker's name could be engraved on the lock or referenced by a serial number in a document.
- Each worker's lock should be opened only by a key that is in the worker's possession and by a key under the control of the supervisor or manager in charge. Combination locks must not be used for lockout.
- Control Tech Industrial must ensure that all subcontractors meet company and legislated lockout requirements before commencing a job.

Managers and Supervisors

- Depending on the size and complexity of the operation, other aspects of the lockout system may have to be established in writing (emergency lock removal and multiple point lockout).
- Responsible to enforce this plan and to see that all their workers and contractors that are affected by lockout/tagout procedures, have the knowledge and understanding required for safe application, usage, and removal of all energy controls and devices.

- Must make sure that each worker required to lock out machinery or equipment has access to enough personal locks to perform the required lockout procedure. These locks must be used for lockout purposes only.
- Ensure workers are competent as demonstrated by being qualified, suitably trained and with sufficient experience to safely perform work.
- Ensure workers are supervised in lockout, as they would be in any other task.

Employees

All workers who work on machinery or equipment requiring lockout are responsible for:

- Locking out the energy-isolating device or placing a personal lock on the key-securing system in a group lockout procedure
- Removing their personal locks on the completion of their work
- Keeping control of the keys to personal locks throughout the duration of the work
- Ensure they are sufficiently trained as per the requirements of this program. All workers must be trained to a level of demonstrated competency in de-energization and lockout.
- Are required to follow the provisions of this program.
- When energy-isolating devices are locked out, the devices must be secured in the safe position using locks in accordance with a written lockout procedure.

28.4 DEFINITIONS

Affected employee - An employee whose job requires them to operate or use a machine or equipment on which servicing and maintenance is being performed under lockout/tagout, or whose job requires the employee to work in an area in which such servicing or maintenance is being performed.

Authorized employee - A person that performs lockout/tagout procedures on machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes authorized when that employee's duties include performing servicing or maintenance covered under this program.

Capable of being locked out - An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild or replace the energy isolating device or permanently alter its energy control capability.

Control System Isolating Device - a device that physically prevents activation of a system used for controlling the operation of machinery or equipment.

Energized - Connected to an energy source or containing residual or stored energy.

Energy isolating device - A device that physically prevents the transmission or release of an energy source to machinery or equipment:

- A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors and no pole can be operated independently, a line valve, a block and any similar device used to block or isolate energy.
- Push buttons, selector switches and other control circuit type devices are not isolating devices.

Energy source - Any source of gas, electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy sources of potential harm to workers.

Hot tap - A procedure used in the repair, maintenance and service activities that involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or other appurtenances

Key Securing System - a system which physically prevents access to key when locks or positive sealing devices are applied in a group lockout procedure.

Lockout - The use of a lock or locks to render machinery or equipment inoperable or to isolate an energy source in accordance with a written procedure.

Lockout device - A device that utilizes a key lock, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Locked Out - If machinery or equipment is shut down for maintenance, no work may be done until all parts and attachments have been secured against inadvertent movement,

Maintenance - work performed to keep machinery or equipment in a safe operating condition, including installing, repairing, cleaning, lubricating and the clearing of obstructions to the normal flow of material.

Normal operation - work that is routine, repetitive, and integral to the normal use of machinery or equipment for production.

Personal Lock - a lock provided by Control Tech for use by a worker to ensure personal lockout protection such that each lock when applied is operable only by a key in the worker's possession, and by a key under the control of the supervisor or manager in charge.

Servicing and/or maintenance - Workplace activities such as constructing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines and equipment, where the employee may be exposed to an unexpected energization or start-up of the equipment or release of a hazardous energy source.

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

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

28.5 TYPES OF HAZARDOUS ENERGY

Kinetic energy - Kinetic energy is the energy of moving equipment or moving materials. For example, materials may move along a conveyor belt even after the electricity is turned off and some parts may need to be restrained or guarded so that they cannot move and injure a worker.

Chemical energy - Chemical energy refers to the energy that can be released by a chemical reaction. Hazardous chemical energy can be released with flammable, combustible, and corrosive substances. For example, fertilizer stored near diesel fuel is a potential source of an explosion.

Potential energy - Potential energy is the energy in suspended, elevated, or coiled materials. A loaded spring is a source of energy, and precautions must be taken to prevent injuries. If gravity could cause something to fall or roll, then there is hazardous potential energy. For example, before a worker works under the forks of a fork-lift truck, the elevated forks carriage must be pinned or blocked.

Thermal energy - Thermal energy is the energy in heat, which is found in steam, hot water, fire, gases, and liquefied gases. For example, a steam pipe that supplies heat or that carries steam under pressure to drive a turbine has hazardous thermal energy and may take time to cool down.

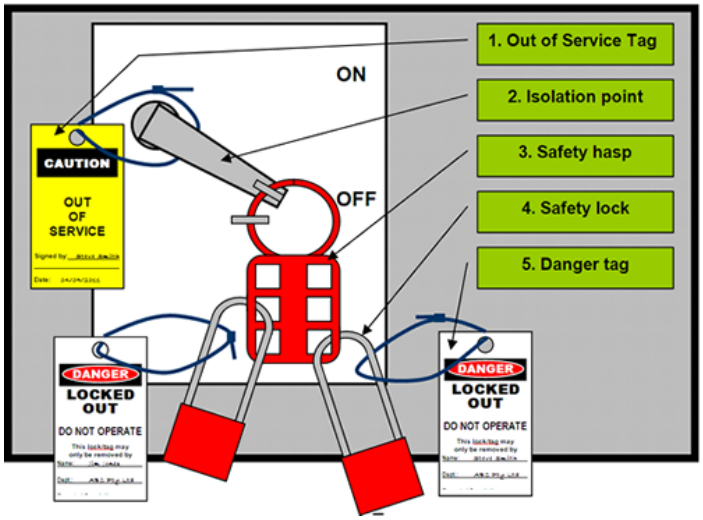
Electrical energy - Conductors, motors, and generators are sources of electrical energy. Both low-voltage and high-voltage equipment and conductors can injure or kill workers. Maintenance work on lighting systems or electrical panels, for example, requires lockout.

Radiation - Radiation energy includes non-ionizing radiation (such as light and lasers) and ionizing radiation (such as X rays). For example, flow measurement equipment in pulp mills can be a source of radiation energy.

28.6 PROCEDURES FOR LOCKOUT TAGOUT

Lockout Tagout is performed by a competent person. If work is to be done that may endanger a worker, Control Tech Industrial shall ensure that the work is done by a worker who is competent to do the work. Workers who may be required to use safety equipment shall be competent in the application, care, use, maintenance and limitations of that equipment. Training must be completed before isolation of energy tasks are allowed.

When lockout of energy isolating devices is required, the devices must be secured in the safe position using locks in accordance with procedures that are made available to all workers who are required to work on the machinery or equipment.



28.6.1 WHEN LOCKOUT IS REQUIRED

A machine must be locked out and tagged out prior to performing maintenance activities.

When the lockout procedure uses a lock and key, Control Tech Industrial must ensure that the lock used has a unique mark or identification tag on it that identifies the worker to whom the lock is assigned.

If machinery could unexpectedly activate or if the unexpected release of an energy source could cause injury, the energy source must be isolated and controlled. This is done through the lockout procedure.

If machinery or equipment is shut down for maintenance, no work may be performed until the following have been done:

- All parts and attachments have been secured against inadvertent movement.
- Where the work will expose workers to energy sources, the hazard has been effectively controlled.
- The energy-isolating devices (such as switches or valves) have been properly locked out.

Follow these steps to determine if worker needs to lock out equipment or machinery:

- View the location where the work is to be done.
- Identify all energy sources.
- Ask: What would be the result if any of the energy sources was released? Would the release of energy or an inadvertent movement be hazardous to a worker?

If there is a hazard to workers: lockout is required. Use a lock on energy-isolating devices to prevent hazardous energy being released, such as through a switch being accidentally turned on and starting a machine. Make sure that all parts and attachments are secured against inadvertent movement.

28.6.2 WHEN LOCKOUT IS NOT REQUIRED

If there is no hazard to workers lockout is not required and workers can follow normal safe work procedures.

Situations may arise during normal production work when some production-related work needs to be done. Lockout may not be required in every case. Note that this applies only to normal production work, not to maintenance. Follow these steps in making a decision about whether or not lockout is required during normal production work:

1. Decide if there is a risk of injury to workers from the movement of the machinery or equipment or exposure to an energy source while the activity is carried out. When assessing the risk of injury, imagine what will happen if the unexpected occurs. All sources of hazardous energy must be considered, such as loaded springs and suspended equipment that could roll or fall.
2. If there is no risk of injury, then lockout is not required.
3. If there is a risk of injury, decide if the machinery or equipment is effectively safeguarded to protect workers from the risk. If there are effective safeguards in place, then lockout is not required.
4. Safe work procedures must be followed during the activity.

Power tools may be maintained, repaired, tested or adjusted without applying isolation control if the work doesn't put the worker at risk by isolating the energy source from the power tool, dissipating any residual energy in the power tool and the energy source remains isolated during the activity.

28.6.3 MAINTENANCE PROCEDURES

When a machine is serviced, repaired, tested, cleaned, maintained, or adjusted, Control Tech Industrial must ensure that no worker performs work on the machine until it has come to a complete stop and the worker performing work on the machine has locked out the machine and removed and rendered safe any hazardous condition.

If machinery or equipment is shut down for maintenance, no work may be done until all parts and attachments have been secured against inadvertent movement, where the work will expose workers to energy sources, the hazard has been effectively controlled or the energy isolating devices have been locked out.

Energy sources must be turned off, disconnected and/or released before maintenance is performed. If the unexpected energization or start-up of machinery or equipment or the unexpected release of an energy source could cause injury, the energy source must be isolated and effectively controlled.

Energy sources must be locked out and tagged out before maintenance is performed. The devices must be secured in the safe position using locks in accordance with procedures that are made available to all workers who are required to work on the machinery or equipment.

Each personal lock must be marked or tagged to identify the person applying it.

A written, step-by-step isolation procedure for shutdown and start up shall be prepared for each type of machine or piece of equipment.

This procedure shall include:

1. Equipment number if assigned.
2. Equipment location.
3. Energy Source(s) (i.e. electrical, hydraulic, gas pressure, etc.)
4. Location of isolating controls (i.e. breaker switches, valves, etc.)
5. Quantity of isolating controls
6. Quantity of locks required to isolate the equipment
7. Other hardware required to isolate the equipment (i.e. chains, valve covers, blocks, etc.)
8. List any residual energy required to be dissipated before work begins.

28.6.4 BASIC STEPS TO LOCKING OUT MACHINERY OR EQUIPMENT

This procedure must be available to all workers who work on the. Before an authorized or affected worker shuts down a machine or equipment, the authorized worker shall have the knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means (locks) to control the energy sources

Once Worker have determined that lockout is required, follow these five basic steps to lock out machinery and equipment. They apply to all types of machinery and equipment. Every worker must know these steps.

1. Identify the machinery or equipment that needs to be locked out.
2. Shut off the machinery or equipment. Make sure that all moving parts have come to a complete stop.
3. Authorized workers must notify all other affected workers to ensure that the act of shutting off equipment does not cause a hazard to other workers.
4. Identify and de-activate the main energy-isolating device for each energy source.
5. Apply a personal lock to the energy-isolating device for each energy source, and ensure that all parts and attachments are secured against inadvertent movement.
6. A state of zero energy must be verified after a lockout device is installed. First ensure that all workers are in the clear and that no hazard will be created if the lockout is not effective. Lockout can be tested after each energy-isolating device is locked out or after a group of nearby devices is locked out. Test the lockout to make sure it's effective and to verify that each energy source has been effectively locked out. Effective means of verifying lockout must be provided and used.

Tagout devices used with energy isolating devices with the capability of being locked out shall be fastened at the same point at which the lock would have been attached. If a tag cannot be directly attached to the energy isolation device it shall be located as close as safely as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

28.6.5 REQUIREMENTS FOR PERFORMING MAINTENANCE WHILE EQUIPMENT IS IN OPERATION

Sometimes machinery or equipment has to be energized for a specific task for example, when making fine adjustments or doing troubleshooting that can only be done with part of the equipment working. If it is not practicable to shut down machinery or equipment for maintenance, only the parts which are vital to the process may remain energized and the work must be performed

- by workers who are qualified to do the work,
- workers who have been authorized by Control Tech Industrial to do the work
- have been provided with and follow written safe work procedures

28.6.6 LOCKING OUT ELECTRICAL EQUIPMENT

Electricity is the most common energy source that needs to be locked out. The two most common types of electrical machinery and equipment are:

- Plugged-in equipment
- Permanently connected or hard-wired equipment

Plugged-in equipment

Follow these steps to lock out plugged-in machinery and equipment:

1. Identify the machinery or equipment that needs to be locked out.
2. Shut off the machine or equipment and make sure that all moving parts have come to a complete stop.
3. Unplug the machine.
4. Apply a personal lock to the plug unless the worker doing the maintenance can keep the plug in view and under control while working on the equipment.
5. Test the lockout to make sure it's effective.

NOTE: If the plug is kept under the exclusive and immediate control of one worker at all times while the maintenance work is being done, then a lock may not be required. The worker should have the plug in sight and within reach so that no one else can accidentally plug in the equipment. However, if the worker leaves the equipment unattended without a lock and the work is incomplete, then the lockout procedure must be re-established when the worker returns. Alternatively, the worker can apply a lock when leaving the equipment.

Permanently connected or hard-wired equipment

Follow these five steps to lock out permanently connected or hard-wired machinery or equipment:

1. Identify the machinery or equipment that needs to be locked out.
2. Shut off the machine and make sure that all moving parts have come to a complete stop.
3. Find the electrical source and disconnect the machine from the power supply.
4. Apply a personal lock to the energy-isolating device, if required. (If there is one switch that is within the exclusive and immediate control of the worker, then a lock may not be required.)
5. After ensuring that all workers are in the clear, test the lockout to make sure it's effective.

28.6.7 LOCKING OUT INTERLOCKED SYSTEMS

When an energy-isolating device such as a switch or valve is locked out, the lock must not prevent access to energy-isolating devices for other machinery or equipment. For example, the panel door of a circuit breaker box should not be locked, just the individual breakers.

Other workers may need access to the other devices for their own lockout or maintenance procedures. Special considerations apply to locking out interlocked systems, such as conveyors. When testing a locked-out component within an interlocked system, one of the following must be done:

- The interlock sequence must be fully completed or overridden.
- Another means may be used to verify that the energy-isolating device has been disconnected only by a qualified person who has knowledge of the interlocked system.

28.6.8 LOCKING OUT HYDRAULIC OR PNEUMATIC SYSTEMS

To lock out hydraulic or pneumatic systems, such as a cylinder that operates a drop gate, follow these five steps:

1. Identify the machinery or equipment that needs to be locked out.

2. Stop the machine. Make sure that all moving parts have come to a complete stop.
3. Find the energy source and disconnect it using one of these methods:
    - Disconnect the electrical power to the pump or compressor.
    - Close the valve feeding the cylinder.
4. Apply a personal lock to the electrical disconnect or the valve. To make sure that all parts have been secured against inadvertent movement, Worker may have to pin or block a drop gate or a weight that is being supported by the stored pressure in the cylinder.
5. Test the lockout to make sure de-energization is effective. Test to make sure the pump or compressor won't start and that the flow doesn't bypass the valve. Tanks under pressure must have the air supply shut off and the pressure bled before servicing.

NOTE: Make sure there is no residual pressure in the lines, reservoirs, or accumulator feeding the cylinder. Bleed any residual pressure. Test to ensure that there is zero energy in the system.

28.6.9 ISOLATING ENERGY SOURCES ON PIPING, PIPELINES OR PROCESS SYSTEMS

If piping, a pipeline or a process system containing a harmful substance under pressure is to be serviced, repaired, tested, adjusted or inspected Control Tech Industrial must ensure that no worker performs such work on the piping, pipeline or process system until flow in the piping, pipeline or process system has been stopped or regulated to a safe level, and the location at which the work is to be carried out is isolated and secured. Consideration of automated valve mechanisms that are controlled from remote sites must be factored into the energy control method.

In order to ensure that harmful substances under pressure are not released Control Tech Industrial will utilize the following methods (with Disconnection/Misalign as the preferred method):

Blinding - Install full-rated blind(s).

Disconnection/Misalign - This involves physically removing part of the equipment, or misaligning piping. Isolation devices shall then be attached as close to the energy source as possible and listed on the Energy Isolation Log.

Double Block and Bleed - This involves three valves - two block valves and a bleed valve in between. For Energy Isolation purposes, all three valves shall be tagged with a "Danger" tag and listed on the Energy Isolation Log. In addition, the two block valves shall be locked.

Single Block - This involves closing one block valve, then applying locks and tags. Note, this option requires the prior approval of the supervisor.

NOTE: Control valves shall not be used for energy isolation. Remote operated valves, designed for positive pressure containment, can be used provided they are disconnected from all energy sources and manually closed.

28.6.10 MULTIPLE WORKERS / GROUP LOCKOUT

Multiple Workers

All workers involved in the maintenance activity must place their own lock and tag on each energy isolation device. Each person working on the machinery or equipment is responsible for locking out the energy-isolating device. Multiple locks can be applied with scissor adapters in the following manner:

1. The first worker who applies the lock must make sure the lockout is effective and the equipment will not start.
2. When each worker has finished maintenance, the worker removes only his or her own personal lock that was placed on the energy-isolating device.

3. The worker who removes the last lock should check that all workers are in the clear and that the equipment can be safely restarted.

Group Lockout (Key-Box)

This procedure reduces the number of locks required and save time. If a number of workers are working on machinery or equipment, particularly if a large number of energy, isolating devices must be locked out. Workers can use a group lockout procedure.

Before implementing a group lockout, a knowledgeable person must plan the procedure ahead of time and develop a written group lockout procedure.

This written procedure must be conspicuously posted at the place where the system is in use.

A tailgate meeting shall be conducted to review the written group lockout procedure and other information as required for safe work to continue.

In a group lockout procedure, instead of each worker putting a personal lock on each energy-isolating device, two qualified workers lock the devices. Their keys are then placed in a key-securing system - for example, a box that can be locked or that can have a seal placed on it. If it has a seal, it must be an approved positive sealing device that cannot be tampered with. A positive sealing device has a seal that will show if the seal has been tampered with.

A "qualified" worker means one who is knowledgeable about the work, the hazards involved, and the means to control the hazards, by reason of education, training, experience, or a combination of those. The two qualified workers are responsible for doing the following:

1. Independently lock out the energy-isolating devices.
2. Secure the keys for the personal locks that were used to lock out those devices. This is done by having each of the two qualified workers apply a personal lock on the key-securing system or by using another approved positive sealing device.
3. Complete, sign, and post a checklist that identifies the machinery or equipment components covered by the lockout.
4. Each worker who is doing maintenance on the locked-out components must apply a personal lock to the key-securing system used by the two qualified workers. After finishing the maintenance work, each worker removes his or her personal lock from the key-securing system. This ensures that no one can remove the locks on the energy-isolating devices until all workers have finished working on the locked-out equipment.
5. After maintenance is complete and all workers have removed their personal locks from the key-securing system, it should be determined if it is safe to end the lockout. If so, the two qualified workers are responsible for removing their personal locks from the key-securing system. If there is a positive sealing device instead, any two workers can be instructed to remove the seal.
6. Once the keys are removed from the key-securing system, the group lockout has ended. The locks may then be removed from the individual energy-isolating devices by any qualified individual.

28.6.11 SHIFT OR PERSONNEL CHANGES - CONTINUITY

In some cases, lockout must be maintained between shift changes to maintain lockout continuity. Procedures must be implemented for shift or personnel changes. This includes the orderly transfer of control of locked-out energy-isolating devices between outgoing and incoming workers.

If locks have not been left on the control devices between shifts, then the workers coming on shift must ensure that lockout is re-established if necessary.

In the event shift or personnel changes occur during maintenance and/or repair activities, the designated Control Tech Industrial worker in charge shall take the necessary steps to maintain the continuity of the lockout/tagout protection.

28.6.12 MULTIPLE POINT LOCKOUT

To effectively lock out equipment with multiple energy sources, Worker will need to lock out several energy isolating devices. Workers may use a cable to lock out several disconnect switches. In order to use the cable lock system follow these steps:

1. Run the cable through the lock hole in each switch Worker are locking out.
2. Fix one end of the cable to a point at the motor control centre.
3. The opposite end of the cable should have an eye that will accept a lock. After securing the final switch, place a lock on the cable eye. The cable diameter must be large enough to prevent the switch from being activated accidentally.

If more than one person is required to lock out, a scissor adapter may be required.

If Worker need to perform multiple point lockouts, a specific lockout procedure may need to be posted by the machinery or equipment

28.6.13 TEMPORARY RELEASE FROM LOCKOUT/TAGOUT

When servicing or maintenance is completed or when Lockout/ Tagout devices must be temporarily removed, the equipment requires testing and the machine or equipment is ready for testing or to return to normal operating conditions, the following steps shall be taken, in this order:

Check the machine or equipment and the immediate area surrounding the machine or equipment to ensure that all nonessential items such as tools have been removed and that the machine or equipment components are operationally intact.

1. Check the work area to verify that no worker is in danger before an worker removes the securing devices and the machinery, equipment, powered mobile equipment, piping, pipeline or process systems is returned to operation.
2. Remove the Lockout/Tagout device.
3. Energize and proceed with testing.
4. De-energize and reapply control methods including Lockout / Tagout devices.
5. Document the procedure by use of the completed isolation log and provide to supervisor for filing.

28.6.14 EMERGENCY LOCK REMOVAL

Generally a personal lock must only be removed by the worker who installed the lock. If necessary the supervisor or manager in charge may remove the lock but only if the person in charge makes every reasonable effort to contact the worker who installed the lock and has made sure that the machinery or equipment can be operated safely before removing the lock.

Procedures that must be followed in the event a worker's lock must be removed in the case of an emergency removal of a lock that another person has applied:

- If the key(s) cannot be made available, the worker who requests removal of the lock shall contact their supervisor.
- Every reasonable effort shall be made by the manager or supervisor to contact the authorized worker who applied the lock to obtain the key(s).
- The manager or supervisor shall ensure that the machinery or equipment can be operated safely before removing the lock and no workers will be in danger if it is removed.

- The competent person removing the lock shall document the lock(s) were removed with permission by manager or supervisor.
- A worker must be notified at the start of his or her next shift if the worker's personal lock(s) have been removed since the worker's previous shift.
- If the equipment is client owned, the supervisor or worker requesting to remove the lock(s) shall contact the client to get the lock removed. Clients must remove their lock(s).

NOTE - Control Tech Industrial workers shall not remove any client locks.

28.6.15 DEVICES

Locks

- Each site shall have the same type of lock as specified by Control Tech Industrial.
- Are made available to all workers who are required to work on the machinery or equipment and shall be provided at the expense of Control Tech Industrial.
- Combination locks must not be used for lockout. Each personal lock must be marked or tagged to identify the person applying it. Tag will include the person's name & signature.

Keys

Control Tech Industrial shall:

- Issue to each worker who is required or permitted to work on a machine a lock that is operable only by that worker's key,
- Ensure that the lock used has a unique mark or identification tag on it that identifies the worker to whom the lock is assigned, and
- Ensure that a logbook is kept to record the use of the duplicate key and the reasons for that use each time the duplicate key is used.

Tagout Device

If an energy source cannot be locked out with a lockout device then a tagout device shall be used. Tagout devices is a warning only level of protection and shall be weather and chemical resistant, standardized in color with clear written warning of hazardous energy; i.e. Do Not Operate, Do Not Start, Do Not Energize, etc. Each site shall have the same style of tags specified by Control Tech Industrial. Each tag will identify the worker who attached it.

Limitations of tags:

- Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.
- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable by all authorized workers, affected workers, and all other workers whose work operations are or may be in the area, in order to be effective.
- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
- Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.
- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

Requirements for Tags

If a tag is used as a means of communication, the tag:

- Shall be made of non-conducting material,
- Shall be secured to prevent its inadvertent removal,
- Shall be placed in a conspicuous location,
- Shall state the reason the switch is disconnected and locked out,
- Shall show the name of the worker who disconnected and locked out the switch, and
- Shall show the date on which the switch was disconnected and locked out.

28.7 CONTRACTORS

Contractors performing lockout procedures on Control Tech Industrial property shall comply with this procedure. Contractors shall supply their own locks. Control Tech Industrial shall initially lockout Control Tech Industrial machines and equipment before the contractor will be allowed to apply their own lock in addition to the one assigned to Control Tech Industrial.

28.8 ANNUAL PROGRAM REVIEW

Each year the manager or supervisor, or his representative, will perform an inspection of the Lockout Tagout Program in their respective areas to verify the effectiveness of the program. An authorized worker other than the one(s) utilizing the energy control procedure being inspected shall perform the check and shall verify that:

- Each authorized and/or affected worker has been trained as required.
- Any new equipment added has specific lockout procedures developed and documented.
- Current procedures are adequate for performing complete isolation of equipment and resulting in a zero energy state.
- The annual audit will be certified in writing and a copy of the audit maintained on file at the managers/supervisors office.

28.9 TRAINING

Employees are provided Lockout Tagout training. Control Tech Industrial shall ensure that a worker who may have to lock out a machine has been adequately trained to lock out the machine. The training shall include the following:

The recognition of applicable hazardous energy (lockout/tagout) sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

The purpose and use of energy control procedures.

All other workers whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

Retraining shall be conducted whenever a periodic inspection reveals, or whenever Control Tech Industrial has reason to believe that there are deviations from or inadequacies in the worker's knowledge or use of the energy control procedures. The retraining shall re-establish worker proficiency and introduce new or revised control methods and procedures, as necessary.

Control Tech Industrial shall certify that worker training has been accomplished and is being kept up to date. The certification shall contain each worker's name and dates of training.

29.0 MACHINE GUARDING

29.1 PURPOSE

The purpose of this program is to provide direction to managers, supervisors, and employees about their responsibilities in the operations and management of Control Tech machine guarding. The material in this document does not take precedence over applicable government legislation which all employees must follow.

29.2 SCOPE

This program applies to all operations where there is a risk to worker safety when working with tools, equipment and machines.

29.3 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the program.

Site Manager

- Responsible for the implementation and maintenance of the program for their site and ensuring all assets are made available for compliance with the plan and appropriate repairs are conducted promptly.

Employees

- All shall be familiar with this program.
- Immediately report any guards that are missing, need repair or maintenance or present any type of concern to the worker.
- Follow all requirements, report unsafe conditions and follow all posted requirements.

29.4 GUARDING REQUIREMENTS

A hazard assessment must be completed by Control Tech where there is a potential to encounter moving parts of machinery, points of machinery at which material is cut/shaped/bored, surfaces with temperatures that may cause skin to freeze/burn/blister, energized cables, debris, material or objects thrown form equipment, material being fed into or removed from process equipment or machinery or equipment that may be hazardous.

Moving parts must be guarded. Control Tech must ensure that machinery and equipment is fitted with adequate safeguards which protect a worker from contact with hazardous power transmission parts, ensure that a worker cannot access a hazardous point of operation and safely contain any material ejected by the work process which could be hazardous to a worker.

Rotating parts, such as friction drives, shafts, couplings and collars, set screws and bolts, keys and keyways, and projecting shaft ends, exposed to contact by workers must be guarded. Exposed moving parts on mobile equipment which are a hazard to the operator or to other workers must be guarded and if a part must be exposed for proper function it must be guarded as much as is practicable consistent with the intended function of the component.

The application, design, construction, maintenance and use of safeguards, including an opening in a guard and the reach distance to a hazardous part, must meet the requirements of CSA Standard Z432-94, Safeguarding of Machinery.

Where there is a possibility of machine failure and of injury to a worker resulting from the failure Control Tech shall install safeguards that are strong enough to withstand the impact of debris from the machine failure and to contain any debris resulting from the failure.

Workers must not wear loose fitting clothing and/or jewelry if they could come into contact with moving parts. If there is a danger of contact with moving parts of machinery then the clothing of the worker must fit closely about the body, dangling neckwear, bracelets, wristwatches, rings, or similar articles must not be worn, except for medical alert bracelets which may be worn with transparent bands that hold the bracelets snugly to the skin, and cranial and facial hair must be confined, or worn at a length which will prevent it from being snagged or caught in the work process.

Control Tech shall place adequate, appropriate and clearly visible warning signs at each point of access to a machine that starts automatically.

Tampering with safeguards is prohibited. A person must not intentionally remove, impair, or render ineffective any safeguard provided for the protection of workers. A fixed guard must not be modified to be readily removable without the use of tools.

If a safeguard for machinery is removed or made ineffective and the machinery cannot be directly controlled by a worker, the worker who removes the safeguard or makes it ineffective must lock out or lock out and tag the machinery or render it inoperative.

Under no circumstances may workers remove a safeguard from a machine that is operating if the safeguard is not designed to be removed when the machine is operating.

A fixed guard must not be modified to be readily removable without the use of tools.

All safeguards required must remain in place at all times and Control Tech shall place adequate, appropriate and clearly visible warning signs at each point of access to a machine that starts automatically.

Guards are required on all types of grinding machines including portable, bench, pedestal and swing-type grinders.

30.0 MANAGEMENT OF CHANGE

30.1 PURPOSE

The purpose of this standard is to assure appropriate review occurs before process and structural changes are made to Control Tech facilities, processes and equipment.

This process relates to change issues including identification, assessment, & required actions. A thorough review of the change should improve the operability and reliability of the change, control the introduction of hazards into the workplace, improve decision-making through collaboration, promote effective communications and teamwork, and ensure conformance with policy, standards, codes and regulations as they apply to Control Tech operations.

30.2 SCOPE

This document is applicable to all employees.

30.3 GENERAL REQUIREMENTS

- A pre-project review must be completed during the planning/development stage. Before a change to facilities, equipment, or work process has been initiated, a review shall be completed to ensure that health, safety, environmental and/or quality standards can be maintained while staying on budget.
- Prior to any change within the scope of this policy, a safety review is to be completed using the Management of Change Procedure Form.
- It is the responsibility of the individual or team proposing the change to follow this procedure and complete the safety review prior to making any changes.
- Once the review has been completed by the individual or team, it must be approved by the Project Manager, as well as senior overseeing Control Tech manager and Safety Manager.
- At the completion of the change, the Project Manager and Safety Manager shall audit the changes against the approved plan.

30.4 PROCEDURE

The Management of Change (MOC) process must be completed for all changes, except replacement in kind. The MOC process must be used for all permanent and temporary changes to the organization's work processes, equipment, and facilities.

A pre-start up review must be completed prior to the change being put into service. Before a change to facilities, equipment, or work process can be placed into service a pre-start up review must be completed to ensure that all requirements outlined in the pre-project review have been addressed, and to ensure that any other possible hazardous conditions are assessed.

All affected personnel/ stakeholders participate in the Management of Change process. Pre-project and pre-start up reviews will include all interested parties. This may include, but is not limited to, Operations, Engineering, Information Technology, Sales/ Marketing, Quality Assurance, and Environmental, Health and Safety.

Describe in detail all proposed changes to the following areas on the Management of Change Procedure Form.

Examples include:

- Utility and Energy Requirements: electrical, hydraulic, compressed air, steam, etc., piping pressures and sizes for liquid and gas supplies, all means for de-energizing utilities provided and identified.

- Hazardous Materials: names and descriptions, SDSs, concentrations, size and type of packaging, flash point, flammable limits, storage requirements, temperatures, etc.
- Waste Disposal: waste generated, containers to be used and locations, amounts, flammability, toxicity, reactivity, ingredients, associated wastes such as gloves and rags, disposal locations, etc.
- Personal Protective Equipment: types required for hazards present or anticipated.
- Personnel: types of training required for hazard communication, waste disposal, PPE, work permits, confined space, moving vehicles, cranes, fire protection, lockout/tagout, new equipment, shifts to be involved, use of temporary employees, qualifications of operators, testing of operators.
- Material Handling: lifting devices required, cranes required, weights to be handled mechanically and manually, forklift requirements, rack storage requirements, access to racks by forklifts, power requirements for lifting aids.
- Fire Protection: access to existing fire extinguishers and fire hoses, sprinklers protected and not obstructed, emergency response procedures.
- Walking Surfaces: Access to aisles, aisles not used for working, aisles designated, clean and smooth surfaces, floor mats, trip hazards.
- Machinery and Equipment: guarding requirements, power transmission guarding, nip points, sharp edges, foot treadles, energy sources, new equipment and tools, maintenance requirements, equipment bolted to the floor, energy isolating requirements (lockout/tagout), special tools required, automatic start or intermittent operations.
- Ergonomics: illumination, noise, worker position and posture, vibration, floor space, machine controls, repetition, force, tool use, heat and cold, emergency stop location.
- Ventilation: airborne contaminants (vapour, gas, dusts, fumes, mists, smoke, vehicle exhaust, etc.), control, methods, amounts of emissions, local and general (dilution) ventilation, CFM, permits required.

Radiation Sources: ultra-violet radiation from arc welding, laser, light energy from cutting, plasma, microwave, radio frequency, etc.

31.0 NOISE – HEARING CONSERVATION

31.1 PURPOSE

The purpose of this program is to provide a process to minimize employee-hearing loss caused by excessive occupational exposure to noise. The material in this document does not take precedence over applicable government legislation which all employees must follow.

31.2 SCOPE

This program is applicable to all employees who may be present or exposed in areas to high noise.

When work is performed on a non-owned or operated site, the client's program shall take precedence and shall be abided by. However, this document covers Control Tech employees and contractors and shall be used on owned premises, or when a client's program doesn't exist or is less stringent. If Control Tech has no control over the noise source at a client location we will abide by the client's signage and instruction.

31.3 RESPONSIBILITIES

Managers and Supervisors

- Ensure requirements of this program are established and maintained.
- Ensure employees are trained and comply with the requirements of this program.

Employees

- Wear hearing protection when required, attend the training and cooperate with testing and sampling.
- If a noise survey confirm that employees are exposed to excessive noise at a work site Control Tech shall have a written procedure to develop and implement a hearing conservation program that includes policies and procedures.

31.4 HEARING CONSERVATION PROGRAM

Noise is surveyed at the work site and Control Tech provides for the selection, use, and care of hearing protective equipment and worker training. Control Tech must ensure that the hearing conservation program includes a plan to educate workers in the hazards of exposure to excess noise and to train workers in the correct use of control measures and hearing protection, the methods and procedures to be used when measuring or monitoring worker exposure to noise, the posting of suitable warning signs in any work area where the noise level exceeds 85 dBA, the methods of noise control to be used and the selection, use and maintenance of hearing protection devices to be worn by workers.

Control Tech must additionally ensure that the hearing conservation program includes the following:

- the methods of engineered noise control to be used;
- the selection, use and maintenance of hearing protection devices to be worn by workers;
- the requirements for audiometric testing and the maintenance of test records;
- an annual review of the policies and procedures to address the effectiveness of the education and training plan, the need for further noise measurement, and the adequacy of noise control measures.

31.5 REQUIREMENTS

Workers must not be exposed to noise that exceeds 85 dBA over an 8 hour time period. Control Tech must ensure that a worker is not exposed to noise levels above 85 dBA Lex daily noise exposure level or 140 dBC peak sound level.

Control Tech shall implement a hearing conservation program developed and appoint a supervisor to oversee the plan.

All employees who work in designated high noise areas must wear hearing protection.

31.6 ENGINEERING CONTROLS

Engineering controls are used to reduce noise whenever practicable. Where the installation of engineering controls is practical Control Tech shall install and use appropriate engineering controls. Control Tech shall reduce worker exposure to noise by implementing the measures indicated hereafter in the following order:

- Reduce the noise at its source;
- Isolate any work station exposed to the noise; then
- Insulate the work areas acoustically.

Control Tech shall ensure that all new places of employment are designed and constructed so as to achieve the lowest reasonably practicable noise level, any alteration, renovation or repair to an existing place of employment is made so as to achieve the lowest reasonably practicable noise level, and all new equipment to be used at a place of employment is designed and constructed so as to achieve the lowest reasonably practicable noise level.

The following is a sample list of conditions encountered that require protection for sound levels. Each work site has other conditions based on equipment and work scope:

- Band Saw 104 dBA 26 6 minutes
- Blower 99 dBA 21 19 minutes
- Chain Saw 110 dBA 32 1 ½ minutes
- Compressed Air 92 dBA 14 1 hr. 35 minutes
- Fire Alarms 95 dBA 17 48 minutes
- Front End Loader 95 dBA 17 48 minutes
- Pneumatic Staking 103 dBA 25 7 ½ minutes
- Pressure Washer 100 dBA 22 15 minutes
- Sprayer, 1,000 gal. 101 dBA 23 12 minutes
- Tables Saw 93 dBA 15 1 hr. 16 minutes
- Wet/Dry Vac 94 dBA 16 1 hour

31.7 NOISE SURVEY

A noise survey is conducted to identify high noise areas. For work performed at a client's location, Control Tech must ensure that employees observe posted noise signage and implement controls as needed.

If a worker is or may be exposed to potentially harmful levels of noise, or if information indicates that a worker may be exposed to a level exceeding 82 dBA Lex, Control Tech must measure the noise exposure.

Workers in a posted noise hazard area must wear hearing protection.

A competent person must evaluate the sources of the noise and recommend corrective actions. The measurements, evaluation and recommendations are to be documented. To evaluate noise exposure in terms of possible hearing damage, it is necessary to know the overall sound level, the exposure time of the individual in hours per day and the length of time the individual has worked in the area being surveyed. This data shall be supplemented by the following:

- Name of area and location
- Date and time of survey
- Name of person conducting survey

- Description of instrument used, model and serial number
- Environmental conditions
- Description of people exposed

All sound measuring equipment must be calibrated before and after each survey.

31.7.1 HEARING PROTECTION

Hearing protectors are used where engineering controls are not practicable to ensure workers are not exposed to noise that exceeds 85 dBA over an 8 hour time period.

If it is not practicable to reduce noise levels to or below noise exposure limits, Control Tech must give to affected workers hearing protection that meets the requirements of CSA Standard Z94.2-02, Hearing Protection Devices – Performance, Selection, Care, and Use, as amended from time to time, and maintain the hearing protection so that it continues to meet those standards. Warning signs shall be posted in the noise hazard areas.

Earmuffs and earplugs shall be made available to the employee in sizes and configurations that will be comfortable to the employee.

31.7.2 HEARING TESTS

Control Tech will, at its expense, provide the employee who is exposed to noise that exceed noise exposure limits an initial audiometric baseline test as soon as is reasonably practicable but not later than six months after the employee is initially exposed to high noise levels and a further test at least once every 12 months after the initial baseline test.

A qualified third party by a hearing tester authorized by the Board shall perform all audiometric testing, evaluation, reporting and retesting. Test results shall be supplied to the employee.

Control Tech must ensure that the authorized hearing tester sends the test results to the Board.

Annual audiograms shall be evaluated as follows:

- Each audiogram shall be compared to the employees' baseline audiogram to ensure the test was valid and to determine if a standard threshold shift has occurred.
- If a standard threshold shift is determined, the employee will be retested within 30 days.
- The retest results will be considered as the annual audiogram.
- Employees shall be informed of their audiometric test results within 30 days of determination.
- If the employee has sustained a standard threshold shift, after retesting, that employee shall be notified and retrained and refitted for appropriate hearing protection and the employee shall be referred for additional medical evaluation if indicated.

31.7.3 RECORDS

Control Tech must keep records of:

- The annual hearing test results for each worker, which must be kept as long as the worker is employed by Control Tech and be kept confidential and not released to anyone without the written permission of the worker or as otherwise required by law.
- The education and training provided to workers and the results of noise exposure measurements.

31.7.4 ANNUAL PROGRAM REVIEW

Control Tech shall conduct an annual evaluation of the program to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

Control Tech shall regularly consult employees required to use hearing protection to assess the employees' views on this program's effectiveness and to identify any problems. Any problems that are identified during this review shall be corrected. Factors to be assessed include, but are not limited to:

- Hearing protection devices (fit, effectiveness, comfort)
- Monitoring of employee hearing test for threshold shifts in order to re-evaluate specific work areas to see if there is any correlation with conditions and test results.
- Effectiveness of and content of training.
- The employee safety committee shall be involved in the annual review.

31.8 TRAINING

Workers are provided training on the hearing conservation program.

Control Tech must inform affected workers of the results of any noise exposure measurement and the significance of the measurement to risk of hearing loss. If noise in the workplace exceeds either of the noise exposure limits, Control Tech must develop and implement an effective noise control and hearing conservation program that includes education and training.

Control Tech shall train the employee in the selection, use and maintenance of hearing protection and the requirement to wear it.

Training shall be updated to be consistent with changes in the work process and PPE requirements.

All staff shall have a copy of this program and it shall be posted at the worksite and a copy made available to all employees, their representatives and regulatory agencies.

32.0 POWERED MOBILE EQUIPMENT

32.1 PURPOSE

This program is to provide safety requirements for mobile equipment used. The material in this document does not take precedence over applicable government legislation which all employees must follow.

32.2 SCOPE

This program applies to all employees of Control Tech performing work. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

32.3 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the requirements of this program.

Site Manager and Supervisor Responsibilities

- Responsible for the implementation and maintenance of this program for their site and ensuring all assets are made available for compliance with this Control Tech program.
- A supervisor must not knowingly operate or permit a worker to operate mobile equipment which is, or could create, an undue hazard to the health or safety of any person, or is in violation of Occupational Health and Safety (OHS) or this Control Tech program.

Operators Responsibilities

- All shall be familiar with this program.
- The operator of mobile equipment must operate the equipment safely, maintain full control of the equipment and comply with the laws governing the operation of the equipment.
- Follow all requirements, report unsafe conditions, and follow all posted requirements.
- Shall use the safeguards, safety appliances and personal protective equipment while following all safe work practices and procedures for the workplace.

32.4 MOBILE EQUIPMENT

32.4.1 EQUIPMENT AND OPERATIONAL USE REQUIREMENTS

Where there is a danger to the operator of a unit of powered mobile equipment or any other worker who is required or permitted to be in or on a unit of powered mobile equipment from a falling object or projectile Control Tech requires that the powered mobile equipment is equipped with a suitable and adequate cab, screen or guard.

Mobile equipment used for lifting or hoisting or similar operations shall have a permanently affixed notation stating the safe working load capacity of the equipment and the notation must be kept legible and clearly visible to the operator.

The operator's manual for powered mobile equipment must be readily available to a worker who operates the equipment.

32.4.2 WHEEL AND TIRE REPAIRS

Control Tech must ensure that a competent person services, inspects, disassembles and reassembles a tire or tire and wheel assembly of powered mobile equipment in accordance with the specifications of both the tire manufacturer and the manufacturer of the powered mobile equipment.

32.4.3 GUARDING MOVING PARTS

Exposed moving parts on mobile equipment which are a hazard to the operator or to other workers must be guarded according to a standard acceptable to the Board, and if a part must be exposed for proper function it must be guarded as much as is practicable consistent with the intended function of the component.

32.4.4 SIGNALING

Where the operator of a vehicle, mobile equipment, crane or similar material handling equipment does not have a full view of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment or its load, the vehicle, mobile equipment, crane or similar material handling equipment shall only be operated as directed by a signaller who is a competent person.

The signaler shall be stationed, in full view of the operator and with a full view of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment and its load; and clear of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment and its load.

32.4.5 RIDER RESTRICTION

The operator of mobile equipment is the only worker permitted to ride the equipment unless the equipment is a worker transportation vehicle.

32.4.6 SEATBELT USE

If mobile equipment has seat belts required by any law, the operator and passengers must use the belts whenever the equipment is in motion or engaged in an operation which could cause the equipment to become unstable.

Seatbelts are required to be used on all powered mobile equipment fitted with rollover protection (ROPS).

BC OHS Regulation Sec 16.32, 16.33 (1). Mobile equipment with ROPS and side boom tractors must have seat belts which meet the requirements of Society of Automotive Engineers (SAE) Standard J386 JUN93, Operator Restraint System for Off-Road Work Machines. Seat belts must be maintained in good condition. If mobile equipment has seat belts, the operator and passengers must use the belts whenever the equipment is in motion, or engaged in an operation which could cause the equipment to become unstable.

32.4.7 WARNING SIGNAL DEVICE OR EQUIPMENT

Mobile equipment in which the operator cannot directly or by mirror or other effective device see immediately behind the machine must have an automatic audible warning device which activates whenever the equipment controls are positioned to move the equipment in reverse, and if practicable, is audible above the ambient noise level.

32.4.8 LIGHTS AND MIRRORS

All mobile equipment must be equipped with a means of illuminating the path of travel at any time and tail lights when, because of insufficient light or unfavourable atmospheric conditions; adequate illumination of

the cab and instruments; suitable clearance lights and reflectors and a mirror providing the operator with an undistorted reflected view to the rear of the mobile equipment.

32.4.9 SECURING TOOLS AND EQUIPMENT

The operator must maintain the cab, floor and deck of mobile equipment free of material, tools or other objects which could create a tripping hazard, interfere with the operation of controls or be a hazard to the operator or other occupants in the event of an accident.

32.4.10 SECURING OF UNATTENDED EQUIPMENT

The operator of mobile equipment must not leave the controls unattended unless the equipment has been secured against inadvertent movement such as by setting the parking brake, placing the transmission in the manufacturer's specified park position and by chocking wheels where necessary.

An operator must not leave unattended any elevated load, part, extension or machine, unless it has been immobilized and secured against inadvertent movement.

32.4.11 FIRE SUPPRESSION

Adequate and approved fire suppression equipment shall be provided on mobile equipment. All vehicles must be equipped with a fire extinguisher. Every vehicle shall carry at least one fire extinguisher of adequate size and of the proper type.

32.4.12 WORKER CLEARANCES

Under no circumstance will a worker be directed, required or permitted to work under or remain in the range of a swinging load or part of unit of powered mobile equipment due to the inherent danger.

32.4.13 SERVICING, MAINTENANCE AND REPAIR

All mobile equipment shall be maintained in safe operating condition and operation, inspection, repair, maintenance and modification shall be carried out in accordance with manufacturer's instructions or, in the absence of the instructions, in accordance with good engineering practice.

No person shall fill the fuel tanks of mobile equipment with gasoline or vaporizing liquids while the engine is running or while a person is smoking in or about the equipment or while there is a known source of ignition in the immediate vicinity.

When a worker is required to work beneath elevated parts of mobile equipment including trucks, the elevated parts shall be securely blocked.

Servicing, maintenance and repair of mobile equipment must not be done when the equipment is operating unless continued operation is essential to the process and a safe means is provided and the process is approved by Control Tech.

Maintenance Records

Maintenance records are kept for powered mobile equipment. Maintenance records for any service, repair or modification which affects the safe performance of the equipment must be maintained and be reasonably available to the operator and maintenance personnel during work hours.

32.4.14 INSPECTIONS

The operator must inspect the equipment before the start of operation on the shift and thereafter as required to ensure the safe operating condition of the equipment.

An inspection must be made in accordance with the manufacturer's specifications.

A written record of the inspections carried out on the powered mobile equipment is kept at the workplace and made readily available to the operator of the equipment.

The operator must report defects and conditions affecting the safe operation of the equipment to the site supervisor. Any defect that affects the safe operation of the equipment must be repaired before the equipment is used.

32.5 TRAINING

A person must not operate mobile equipment unless the person has received adequate instruction in the safe use of the equipment and has demonstrated to a qualified supervisor or instructor competency in operating the equipment.

To be certified, equipment operators will show competence in the machine they are operating including but not limited to:

- Provincial Legislation
- Site Evaluations
- Equipment Operations
- Equipment Controls
- Reporting Requirements
- Inspections
- Maintenance
- Signalling
- Maintenance Repair Records
- Safety Meeting Attendance

Training Requirements for BC

A person must not operate mobile equipment unless the person:

- has received adequate instruction in the safe use of the equipment
- has demonstrated to a qualified supervisor or instructor competency in operating the equipment
- if operating equipment with air brakes, has a valid air brake certificate or a driver's license with an air brake endorsement, or evidence of successful completion of a course of instruction on air brake systems by an organization acceptable to the Board
- is familiar with the operating instructions for the equipment

32.6 TOOLS AND MACHINERY - BC

Machinery may only be operated by competent persons. A machine or piece of equipment may only be operated by authorized persons. A person must not be authorized to operate a machine or piece of equipment until the person has been adequately instructed and trained, and has demonstrated an ability to safely operate it.

Maintenance records are kept for tools and/or machinery. An effective written or other permanent recording system or log must be immediately available to the equipment operator and to any other person involved with inspection and maintenance of the equipment.

Defective tools and/or machinery must be removed from service. An unsafe tool, machine, or piece of equipment must be removed from service and identified in a manner which will ensure it is not inadvertently returned to service until it has been made safe for use.

32.7 ATV VEHICLES

If a Control Tech work site utilizes ATV vehicles then the following shall apply:

If the manufacturer has not set limits for operation of the ATV on sloping ground, 5% is the maximum allowable slope unless Control Tech has developed and implemented written safe work procedures appropriate for any steeper slope on which the equipment is to be used and ensured that their operators have been trained and certified as competent.

Loading and unloading of an ATV onto or off a carrier vehicle must be done in a safe manner. If ramps are used when loading or unloading an ATV they must be placed at a suitable angle, be sufficiently wide and have a surface finish which provides an adequate grip for the ATV's tires.

32.7.1 OPERATOR AND SUPERVISOR RESPONSIBILITIES

The operator must operate the UTV in a safe manner, maintaining full control and complying with the regulations that apply to the operation of the machine.

The supervisor must not either knowingly operate or allow a worker to operate mobile equipment that could present an undue risk to anyone or that is in violation of the legislation.

32.7.2 MODIFICATIONS

Any modification that could impact the structural integrity or stability of an ATV must be certified by a Professional Engineer (e.g., the addition of drills to ATVs, spray or fluid tank packages, other accessory additions to the unit, jacking up the frame, and oversized tires).

Some accessories and add-ons are allowed by manufacturers. Check with the manufacturer's manual to find out what is or is not allowed.

32.7.3 OPERATOR'S MANUAL

The ATV operator's manual must be kept with the unit or at another location nearby where it is readily accessible to the operator. The usual location is in a waterproof bag or case under the operator's seat.

32.7.4 OPERATOR'S RESPONSIBILITIES

The ATV operator must use the unit in accordance with the operator's manual supplied by the manufacturer.

The ATV must be operated in a safe manner at all times, with the operator maintaining full control of the unit and complying with the sections of the Regulation that apply to its operation. (This would prohibit the operator from doing tricks and extreme riding)

The operator must conduct and document pre-use inspections of the ATV

Operator must not drink alcohol or use drugs of any kind while operating the machine. (See: Drug & Alcohol program)

32.7.5 USE ON SLOPES

If the manufacturer's manual contains slope limits for the ATV (up, down, and cross slope), these are the maximum slopes that the unit can be operated on.

If the manufacturer has not established maximum safe operating slopes, a 5% slope is the maximum allowable slope.

In the absence of guidance from the manufacturer, Control Tech can develop and implement appropriate safe work procedures for the equipment to be used. Such procedures will be specific to the type and mode of ATV and will include:

- Maximum up, down, and side slopes

- Assessment of the types of loads that may be carried and where any loads may be carried
- The means by which slope gradient will be assessed by the ATV operator

Maximum allowable slopes must be based upon criteria that will ensure the stability of the ATV when it is operated on the slope (e.g., manufacturer's guidance or stability testing, Professional Engineer's principles, etc.).

Workers must be trained and educated in the safe work procedures

32.7.6 OPERATOR TRAINING

Control Tech must ensure that all ATV operators are properly trained in the safe operation of the equipment.

Any ATV operator training must cover:

- Manufacturer's Operating Manual
- Knowledge regarding all safety signs on the machine
- Pre-trip inspections
- Use of appropriate PPE
- Operating skills in accordance with the manufacturer's instructions
- Basic mechanical requirements of the machine
- Proper safe loading and unloading of the machine
- Safe use of winches as outlined by the manufacturer of the UTV/ATV

Before operating the ATV, the operator must demonstrate competency in operating the machine to a qualified supervisor or instructor.

32.7.7 PERSONAL PROTECTIVE EQUIPMENT (PPE)

When operating an ATV, the operator and any passengers (if allowed by the manufacturer) must wear:

- Appropriate eye and hearing protection
- clothing suitable for the environmental conditions and when necessary to protect against the hazards presented at the worksite, suitable gloves and clothing which covers the ankles and legs and the arms to the wrists and appropriate footwear
- Approved motorcycle helmet (a full-face helmet is recommended as it provides protection to the jaw area, which has been a common area of injury in ATV operators)
- CSA Standard CAN3-D230-M85 approved helmets shall be worn by the operator and passenger.
- CSA Standard Z94.3 approved eye or face protectors is required if the all-terrain vehicle, snowmobile or towed conveyance does not have an enclosed cab.
- hearing protection as required by local regulatory requirements and the Control Tech PPE Program

32.7.8 SAFE LOADING AND UNLOADING

Loading and unloading the ATV on or off a vehicle or trailer carrier must be done in a safe manner.

If used, ramps must be at a suitable angle, be wide enough, and have an appropriate grip surface for the ATV tires to properly grip and not slip.

32.7.9 OPERATION AND MAINTENANCE

Maintenance records must be kept and made available to the operator.

Proper servicing and maintenance appropriate to conditions of use includes modifications to the structural supports of the drive train of these units (For example, raising the frame of the UTV to permit the installation of oversized tires raises the centre of gravity and makes the unit unstable and prone to rolling over.)

Pre-use inspections must be performed and documented.

32.7.10 GUARDING

UTV operators must be protected from falling, flying, or intruding objects by means of suitable guards or structures. Operating these units without proper side doors and undercarriage skid plates has resulted in serious injuries and incidents involving operators of these units.

Side doors and metal skid plates are needed to properly protect the operators.

32.7.11 ROLLOVER PROTECTIVE STRUCTURES (ROPS) AND SEATBELTS

ROPS may be required to be installed if the design of the equipment or circumstances of use indicate the need (for example, steep or uneven terrain)

Seatbelts must be worn whenever the equipment is in motion or could become unstable. Note: Some UTVs come with a roll cage that is NOT a certified ROPS.

33.0 RADIATION SAFETY

33.1 PURPOSE

The purpose of this program is to protect workers who may encounter ionizing radiation and its hazards while performing work. Control Tech ensures essential information and instruction regarding the hazard of ionizing radiation is communicated to our staff to minimize any potential exposure to ionizing radiation. The material in this document does not take precedence over applicable government legislation which all workers must follow.

33.2 SCOPE

This program is to be followed by workers who deal with or approach a radiation source. If practicable, workers are to be involved in developing and implementing the safe work practices and procedures. Control Tech must inform the workers of the potential hazards of ionizing radiation and the radiation source.

When work is performed under a prime contractor (in charge of a site where multiple companies are working together) or hiring company on a worksite, the prime contractor or hiring company's program shall take precedence and shall be abided by.

33.3 RESPONSIBILITIES

Company

- must take all reasonable precautions to protect workers from radiation injury,
- must ensure that workers are informed of the potential hazards of the radiation and of the precautions to be taken to protect workers and other persons from those hazards, and
- must ensure that the installation, maintenance, repair, testing, use or operation of radiation equipment is done by a competent worker

Workers

- Follow safety controls as set out by management
- Where proper PPE for jobs
- Follow signage
- Report incidents immediately

33.4 DEFINITIONS

Radiation - means the emission by a nuclear substance, the production using a nuclear substance, or the production at a nuclear facility of, an atomic or subatomic particle or electromagnetic wave with sufficient energy for ionization.

Ionizing Radiation – Ionizing radiation is a type of energy released by atoms that travels in the form of electromagnetic waves (gamma or X-rays) or particles (neutrons, beta or alpha). The spontaneous disintegration of atoms is called radioactivity, and the excess energy emitted is a form of ionizing radiation.

Sources of ionizing radiation encountered at the workplace may include x-ray and radioactive material

Non-Ionizing Radiation – does not have enough energy to disrupt the structure of atoms or molecules. However, it may have biological effects such as heating or initiating photochemical reactions. Non-ionizing radiation includes ultraviolet light, visible light, infrared light, microwaves, radio waves and electricity.

Regulations Governing Radiation – Provincial level includes Radiation Protection Act and the Radiation Protection Regulation. At the Federal level Canadian Nuclear Safety Commission (CNSC) and the Nuclear Safety and Control Act (Canada)

Dosimetry service - means a prescribed facility for the measurement and monitoring of doses of radiation.

Nuclear energy - means any form of energy released in the course of nuclear fission or nuclear fusion or of any other nuclear transmutation.

Nuclear energy worker - means a person who is required, in the course of the person's business or occupation in connection with a nuclear substance or nuclear facility, to perform duties in such circumstances that there is a reasonable probability that the person may receive a dose of radiation that is greater than the prescribed limit for the general public.

Nuclear substance

- deuterium, thorium, uranium or an element with an atomic number greater than 92
- a derivative or compound of deuterium, thorium, uranium or of an element with an atomic number greater than 92
- a radioactive nuclide
- a substance that is prescribed as being capable of releasing nuclear energy or as being required for the production or use of nuclear energy
- a radioactive by-product of the development, production or use of nuclear energy and
- a radioactive substance or radioactive thing that was used for the development or production, or in connection with the use, of nuclear energy

33.5 GENERAL INFORMATION ABOUT IONIZING RADIATION

- Ionizing radiation is a type of energy released by atoms in the form of electromagnetic waves or particles.
- People are exposed to natural sources of ionizing radiation, such as in soil, water, and vegetation, as well as in human-made sources, such as x-rays and medical devices.
- Ionizing radiation has many beneficial applications, including uses in medicine, industry, agriculture and research.
- As the use of ionizing radiation increases, so does the potential for health hazards if not properly used or contained.
- Acute health effects such as skin burns or acute radiation syndrome can occur when doses of radiation exceed certain levels.
- Low doses of ionizing radiation can increase the risk of longer term effects such as cancer.
- As a rule, the dangers of radioactive exposure are less visible than those of other hazardous materials, and the presence of dangerous levels of radioactivity is hard to detect; it can only be detected with special monitors. Its effect on the human body may not be evident for days, weeks, or even years after exposure occurs. As ionizing radiation is applied to humans, the effects may include dermatitis, redness of the skin, skin cancer, hair loss, and eye inflammation.
- The human body is able to tolerate a certain level of ionizing radiation; after all, we are continuously exposed to ionizing radiation from natural sources, such as cosmic radiation from outer space, and from radioactive materials in the earth. The degree of injury that is inflicted on a person by radiation exposure depends on several factors, such as the amount of the radiation dose, the duration of the dose, the rate at which the dose was received, the type of radiation received, and the body parts receiving the dose.

33.6 TYPES OF RADIATION AND EXPOSURE

COMMON SOURCES OF NON-IONIZING RADIATION AT THE WORKPLACE		
TYPE OF RADIATION	**SOURCE/USES**	**WORKERS EXPOSED**
Ultraviolet light	• Welding • Sunlight • Fluorescent Lamps • Mercury & Xenon Lamps	• Welders • Outdoor Workers • Lighting Technicians • Laboratory Personnel
Infrared light	• Industrial Heaters & Dryers • Sunlight • Welding • Lasers	• Welders • Glass Factory Workers
Microwaves	• Radar • Cooking • Communication – (Microwave communication — television, weather radar, satellite communication, marine navigation, taxi, police/fire/ambulance, CB radios, microwave relay towers, radio navigation) • Microwave Diathermy • Telemetry	• Broadcasting And • Communication Workers • Medical Personnel • Physiotherapists • Marine Personnel
Radio frequency	• Industrial Heating (Induction • & Dielectric), Sealing, • Gluing, Melting, Tempering, Welding, Polymerization and Sterilization • Communication (Radiofrequency (RF) communications — radio navigation, AM/FM radio, marine broadcasting, CB radios, television, air traffic control, police/fire/ ambulance) • Metallurgy • Medical And Short Wave • Diathermy • Cellular Telephones	• Broadcasting And Communication Workers • Factory Workers • Plastic Sealer Operators • Medical Personnel • Air Crews • Engineers/Mechanics/ Technicians/Maintenance Workers
Extremely low frequency (ELF)	• Electricity Transmission • Induction Heaters • Steel And Aluminum Industry	• Electrical Utility Workers • Factory Workers
Static magnetic fields	• Magnetic Resonance Imaging • Nuclear Magnetic Resonance	• Medical Personnel Laboratory Personnel

COMMON SOURCES OF IONIZING RADIATION AT THE WORKPLACE		
TYPE OF RADIATION	**SOURCE/USES**	**WORKERS EXPOSED**
Radon	naturally-occurring gas, emanates from rock and soil and is the main source of natural radiation. People inhale and ingest radionuclides from air, food and water.	Workers working outside in various locations and industries

Cosmic Rays	80% of the annual dose of background radiation that a person receives is due to naturally occurring terrestrial and cosmic radiation sources. Exposed at high altitude	Airline workers, astronauts
Nuclear Radiation	Radiation around nuclear power generating stations	nuclear power plant workers
X-Rays	Medical uses of radiation for diagnosis or treatment. Medical devices, including X-ray machines	Medical services workers. X-ray technicians
gamma radiography	x-raying oil & gas pipelines for leaks & weaknesses.	radiographic operations technicians

NORM – "naturally occurring radioactive materials" (NORM). These are radioactive materials that have always been present in various concentrations in the environment and in the tissues of every living animal, including people. Such materials have the potential to cause cancer in persons exposed to them.

INDUSTRY	WHERE NORM MAY BE FOUND OR RELEASED
Mineral Extraction and Processing	May be released or concentrated in a process stream during the processing of ore, such as in the phosphate fertilizer industry and the abrasives and refractory industries
Oil and Gas Production	May be found in the fluids and gases from hydrocarbon-bearing geological formations
Metal Recycling	Contaminated materials are redistributed to other industries resulting in the formation of new NORM- contaminated products
Forest Products and Thermal	Electric Production mineral ashes left from combustion may concentrate small amounts of NORM naturally present in plant material and coal
Water Treatment Facilities	Fresh or waste water is treated through sorptive media or ion-exchange resins to remove minerals and other impurities from the water being treated and may release radon (geothermal sources, fish hatcheries)
Tunneling and Underground Working	The concentration of radioactive substances in these materials may increase to levels at which special precautions are needed for handling, storing, transporting, and disposing of material, by - products, end - products or process equipment

33.7 HEALTH EFFECTS AND HAZARDS OF RADIATION

33.7.1 NON-IONIZING RADIATION

The most common and well - known hazards of ultraviolet light are:

- sunburn, which can lead to premature skin aging and skin cancer
- welder's flash
- macular degeneration of the eye
- possible cataract formation

The most common and well - known hazards of lasers are:

- eye injuries and skin burns.

The Radiation Protection Regulation designates Class 3b and 4 lasers as requiring registration certificates.

The Regulation further describes protective measures for the use of all classes of lasers by referencing CSA Standard CAN/CSA-Z386-01, Laser Safety in Health Care Facilities, and ANSI Standard ANSI-Z136.1-2000, American National Standard for the Safe Use of Lasers.

33.7.2 IONIZING RADIATION:

Radiation damage to tissue and/or organs depends on the dose of radiation received, or the absorbed dose which is expressed in a unit called the gray (Gy). The potential damage from an absorbed dose depends on the type of radiation and the sensitivity of different tissues and organs.

Radiation can impair the functioning of tissues and/or organs and can produce acute effects such as skin redness, hair loss, radiation burns, or acute radiation syndrome. These effects are more severe at higher doses and higher dose rates. For instance, the dose threshold for acute radiation syndrome is about 1 Sv (1000 mSv).

When Ionizing radiation penetrates living tissues, the chemical structure of living cells may be changed. If enough radiation is absorbed, cells may be altered or destroyed. In some cases, these cellular changes could develop into cancer, or cause genetic damage or birth defects.

Prenatal exposure to ionizing radiation may induce brain damage in unborn babies following an acute dose exceeding 100 mSv between weeks 8-15 of pregnancy and 200 mSv between weeks 16-25 of pregnancy. Before week 8 or after week 25 of pregnancy human studies have not shown radiation risk to fetal brain development. Epidemiological studies indicate that the cancer risk after fetal exposure to radiation is similar to the risk after exposure in early childhood.

33.8 EXPOSURE LIMITS

The exposure limits represent international consensus on radiation protection standards. A worker's exposure to ionizing radiation must not exceed any of the following:

- an annual effective dose of 20 mSv;
- an annual equivalent dose of
  - 150 mSv to the lens of the eye,
  - 500 mSv to the skin, averaged over any 1 cm^2 area at a nominal depth of 7 mg/cm^2, regardless of the area exposed, or
  - 500 mSv to the hands and feet.

Control Tech must ensure that the exposure of workers to ionizing radiation is kept as low as reasonably achievable below the exposure limits. Control Tech must ensure that a worker's exposure to non-ionizing radiation does not exceed the regulated exposure limits.

Guiding Principles:

One of the guiding principles of radiation protection is the ALARA principle. According to the principle, exposure of radiation workers and other persons to ionizing radiation is kept “As Low As Reasonably Achievable — economic and social factors being taken into consideration.”

33.9 HAZARD CONTROLS THAT ARE IN USE TO PREVENT WORK EXPOSURE TO RADIATION

Radiation protection, sometimes known as radiological protection, is the science and practice of protecting people and the environment from the harmful effects of ionizing radiation. Ionizing radiation is widely used in industry and medicine, and can present a significant health hazard.

If workers may be exposed to ionizing radiation at a work site Control Tech must inform the workers of the potential hazards of ionizing radiation and the radiation source.

The following practices and procedures apply to Control Tech operations where workers may be exposed to ionizing radiation. If workers may be exposed to ionizing radiation at a work site Control Tech must develop and implement safe work practices and procedures to be used when the workers deal with or approach the radiation source. Radiation is strongly regulated and companies who operate x-ray equipment must be registered and are randomly audited by inspectors.

33.10 WORKER INVOLVEMENT

Workers are provided training on the hazards of radiation. If workers may be exposed to ionizing radiation at a work site Control Tech must inform the workers of the potential hazards of ionizing radiation and the radiation source.

33.11 EXPOSURE CONTROL PLAN

If a worker exceeds or may exceed an action level for ionizing radiation or action level for non-ionizing radiation Control Tech must develop and implement an exposure control plan. The instructions to workers developed must be posted or otherwise available in the work area or near the applicable equipment controls.

33.11.1 PRECAUTIONARY PROCEDURES AND PERSONAL MONITORING

Radiation workers who use or are exposed to the operation of certain types of ionizing radiation equipment require personal exposure monitoring. Hazard controls that are in use to prevent work exposure to radiation include the following:

Survey

Except as otherwise determined by the Board, Control Tech must conduct a radiation survey for ionizing radiation in accordance with the standard practice specified under the applicable Safety Code or the regulations under the Nuclear Safety and Control Act (Canada):

- at the times required by the Safety Code or regulations, as the case requires,
- if equipment has been damaged or modified, or
- if there is an indication of an unusually high exposure of a worker to ionizing radiation.

Control Tech shall ensure that survey of the area has been taken and appropriate restricted areas established at the client worksite prior to beginning work. Survey means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment, and measurements of levels of radiation or concentrations of radioactive material present.

Monitoring

Unless exempted by the Board, if a worker exceeds or may exceed the action level for ionizing radiation Control Tech must ensure that the worker is provided with and properly uses a personal dosimeter acceptable to the Board.

Control Tech shall ensure the supply of appropriate personnel monitoring equipment, such as film badges, pocket chambers, pocket dosimeters, or film rings, and shall require the use of such equipment by each employee who enters a restricted area. All shall be calibrated as required and be acceptable to the Board.

Signs

The symbol prescribed by this paragraph is the conventional three-bladed design. The three blades and the central disk of the symbol shall be magenta or black; and located on a yellow background.

Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: CAUTION RADIATION AREA.

Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: CAUTION HIGH RADIATION AREA.

Each area or room in which radioactive materials in regulated amounts are stored shall post a sign or sings bearing the radiation caution symbol and the words: CAUTION RADIOACTIVE MATERIAL.

33.12 TRAINING

<u>All workers will be provided training on the hazards of radiation:</u>

- The occurrence of radioactive materials or of radiation in such portions of the radiation area
- The safety problems associated with exposure to such materials or radiation and in precautions or devices to minimize exposure, including but not limited to time, distance, shielding and methods of keeping exposure limits as low as reasonably achievable (ALARA), and
- Shall be advised of reports of radiation exposure which workers may request a copy of.

33.13 RECORDKEEPING

Control Tech shall post a current copy of the applicable regulations and a copy of the operating procedures applicable to the work conspicuously in such locations as to insure that workers working in or frequenting radiation areas will observe these documents on the way to and from their place of employment or shall keep such documents available for examination of workers upon request.

Control Tech shall maintain records of the radiation exposure of all workers for whom personnel monitoring is required and advise each of his workers in writing of his individual exposure on at least an annual basis.

Control Tech must maintain and make available to the Board, for at least 10 years, records of radiation surveys, and for the period that the worker is employed plus 10 years, records of exposure monitoring and personal dosimetry data and make the records available to workers.

34.0 RESPIRATORY PROTECTION

34.1 PURPOSE

It is our intention to provide a respiratory protection program that meets or exceeds all standards for Canada. The material in this document does not take precedence over applicable government legislation which all employees must follow.

34.2 SCOPE

This procedure applies to all managers, supervisors, employees and subcontractors of Control Tech jobsites where there may be a risk to workers of airborne contamination or oxygen deficiency. When work is performed on a site under the control of a prime contractor, the prime contractor program shall take precedence.

34.3 RESPONSIBILITIES

Manager

- Ensuring respirators are available and ready to use when needed

Supervisor

- The supervisor is responsible for identifying the need for a respirator.
- Ensure respirators are cleaned, stored, inspected as required

Employee

- Must wear respirator when required to do so for a specific job or at a specific worksite.
- Ensure you are fit-tested before wearing a respirator

34.4 DEFINITIONS

CSA – The Canadian Standards Association, a widely recognized standards setting body.

IDLH Immediately Dangerous to Life or Health - An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape.

<u>This condition is assumed under any one of the following conditions:</u>

- A known contaminant at an IDLH concentration
- A known contaminant at an unknown concentration
- An unknown contaminant
- An oxygen deficiency (less than 19.5 %)
- Contaminants at or above lower explosive limit or
- A confined space which has not been tested for a safe atmosphere

NIOSH - National Institute of Occupational Safety and Health, a standards setting body which is based in the United States. This body sets standards for respirator construction and use.

Qualitative Fit-Test (QLFT) - A pass/fail test method that relies on the subject's sensory response to detect a challenge agent in order to assess the adequacy of the respirator fit.

Quantitative Fit-Test (QNFT) - A fit-test method that uses an instrument to assess the amount of leakage into the respirator in order to assess the adequacy of respirator fit.

34.5 TRAINING

Workers are trained on the selection, use and care of respiratory protective equipment. Control Tech shall ensure that a worker who wears respiratory protective equipment

As well as the respirator user, the following persons must be trained to ensure the proper use of respirators:

- The supervisor of the respirator user
- The person issuing respirators
- The person performing fit-checks
- The person maintaining and repairing respirators
- The training must be repeated at least annually.

The training program content will comply with CSA Standard Z94.4-.02.

Control Tech must ensure that a worker using the respiratory protective equipment

- Is adequately trained by a competent person in the proper fit, testing, maintenance, use and cleaning of the equipment and in its limitations;
- Is able to test, maintain and clean the equipment;
- Is able to use the equipment safely; and
- Inspects and tests the equipment before each use.
- What the limitations and capabilities of the respirator are.
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators

Retraining shall be administered annually, and when the following situations occur

- Changes in the workplace or the type of respirator render previous training obsolete;
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or
- Any other situation arises in which retraining appears necessary to ensure safe respirator use.

34.6 TYPES OF RESPIRATORS

34.6.1 DUST MASKS (FILTERING FACEPIECES)

These simple, two-strap disposable dust masks are designed only for dusts. They are not as protective as other respirators, but do an adequate job in many cases, unless the dust is really toxic or copious. Don't confuse these two-strap masks with the less protective one-strap dust mask designed only for pollen or non-toxic dust.

34.6.2 AIR-PURIFYING RESPIRATORS

Air-purifying respirators can be either full-face or half masks with mechanical or chemical cartridges to filter dusts, mists, fumes, vapours or gases. They are available in three types - disposable, reusable, and disposable/reusable.

- Disposable air-purifying respirators are intended to be used once or until the cartridge expires. The cartridges are permanently attached and have no replacement parts.
- Reusable air-purifying respirators use both replaceable cartridges and parts. NOTE - The replaceable cartridges and parts must be from the same manufacturer.
- Disposable/reusable air-purifying respirators have no replaceable parts except cartridges.

Cartridge respirators and canister masks shall be marked to identify the nature of protection provided, shall not be used otherwise than as marked, shall not be used for periods of time in excess of their usefulness and shall not be used in atmosphere deficient in oxygen.

Air-purifying respirators cannot be used in oxygen-deficient atmospheres, which can result when another gas displaces the oxygen or consumption of oxygen by a chemical reaction occurs. Oxygen levels below 19.5% require either a source of supplied air or supplied-air respirator protection. Levels below 16% are considered to be unsafe and could cause death.

34.6.3 POWERED AIR PURIFYING RESPIRATOR (PAPR)

Powered Air Purifying Respirators have a battery pack that draws air through replaceable cartridges and blows into a full facepiece, helmet or hood. . They filter dusts, mists, fumes, vapours and gases, just like ordinary air-purifying respirators. These respirators are often more comfortable in hot weather and some can provide more protection, depending on the type. The cartridges must be changed regularly as describe for half-face respirators above.

Cartridge respirators cannot provide protection in all instances. Some of their limitations include:

- They do not provide oxygen and so cannot be used in oxygen deficient atmospheres.
- They cannot be used to enter atmospheres that are Immediately Dangerous to Life or Health (IDLH)
- They should not be used to enter unknown atmospheres.

Mixing parts from other respirator manufacturers is prohibited. This includes airline hoses, valves, gaskets, cartridges, etc. For example, do not use North cartridges or calve gaskets with an MSA product.

34.6.4 SUPPLIED AIR RESPIRATORS AND SELF-CONTAINED BREATHING APPARATUS (SCBA)

If a worker is required to enter or work in an IDLH or oxygen deficient atmosphere the worker must wear a full face piece positive pressure respirator which is either an SCBA, or an airline respirator with an auxiliary self-contained air cylinder of sufficient capacity to permit the worker to escape unassisted from the contaminated area if the air supply fails.

Used in situations including large chemical spills or leaks, entering a confined space where there is lack of oxygen or high levels of air contaminants, or working around extremely toxic chemicals. They may also be necessary working at hazardous waste sites, during sandblasting or in some spray painting operations. “Supplied air,” means that clean air is provided by means of an air hose from a compressor or a pressurized air tank.

Supplied air respirators are required when a respiratory hazard is considered “immediately dangerous to life or health” (also called “IDLH”). Respiratory hazards are classified as IDLH as follows:

- There is a lack of oxygen (less than 19.5% oxygen),
- There is too much oxygen (more than 23.5% - a fire hazard),
- You know there are toxic chemicals in the air, but you don’t know how much,
- The amount of chemical in the air is known or expected to be above the IDLH level for that chemical. See the NIOSH Pocket Guide to Chemical Hazards for chemical IDLH levels.

Levels of chemicals above IDLH can occur in confined spaces, or enclosed spaces where there is little or no ventilation.

34.6.5 EMERGENCY ESCAPE RESPIRATORS

Emergency escape respirators, as the name implies, can only be used for one thing – to escape or exit from a room, building, or worksite in an emergency, usually a large chemical release, leak or spill, H2S release, or

when a supplied air respirator fails or runs out of air. An escape respirator is typically a small bottle or tank of air connected to a facepiece.

An IDLH OR Oxygen Deficient Atmosphere

Where a worker is required to enter an atmosphere that is immediately dangerous to the life or health of the worker, Control Tech shall ensure that the worker is provided with and uses an approved atmosphere-supplying respirator that is:

- an open-circuit SCBA that operates in a pressure demand or other positive pressure mode, has a minimum rated capacity of 30 minutes, is sufficiently charged to enable the worker to perform the work safely; and is equipped with a low-pressure warning device or an escape respirator
- an airline respirator equipped with a full facepiece that operates in a pressure demand or other positive pressure mode, and has an auxiliary supply of air sufficient to allow the worker to escape in case of failure of the primary air supply equipment, or
- a closed-circuit SCBA.

34.7 GENERAL REQUIREMENTS

Respiratory hazards are controlled using ventilation where ever practicable. Where ventilation is not practicable, workers potentially exposed to airborne contaminants must wear respiratory protective devices.

Every ventilation system installed to control the concentration of an airborne hazardous substance shall be so designed, constructed, installed, operated, and maintained that the concentration of the airborne hazardous substance does not exceed the exposure limits.

Where there is a hazard of an airborne hazardous substance or an oxygen deficient atmosphere in a workplace, Control Tech shall provide a respiratory protective device that protects against the hazardous substance or oxygen deficiency, as the case may be.

Where a worker is likely to be exposed to dust, fumes, gas, mist, aerosol, or vapour or any airborne contaminant that may be present in any amounts that are harmful or offensive to the worker, Control Tech shall provide an approved respiratory protective device for use by the worker that provides suitable and adequate protection to the worker from one or more airborne contaminants.

Engineering controls will be considered the primary means of controlling respiratory hazards. Respiratory protective equipment will only be used as a means of supplementing the protection provided by engineering controls or when engineering controls are:

- not in existence or not obtainable
- not reasonable or practical due to frequency, duration or nature of the operation or procedure
- rendered ineffective due to a temporary breakdown
- ineffective to control in an emergency situation such as a spill

The Safety Coordinator will assess the need for the respiratory protective equipment and will select the appropriate type for the use situation. The selection criteria used will follow CSA Standard Z94.4-.02.

Only respirators accepted and approved by NIOSH or equivalent will be used.

A qualitative fit-test is the minimum fit-test required. The results of the fit test shall be used to select the specific model and size of facepiece for the individual user.

For an IDLH atmosphere a quantitative fit-test must be used. Fit-tests must be repeated:

- At least every two years
- Whenever there is a change in respirator facepiece (eg, brand, model or size)

- Whenever there is a change in the user's physical condition that could affect the respirator fit.

Under no circumstances shall a respirator be worn if a satisfactory fit test has not been achieved

Respirator users must be clean-shaven where the respirator's facepiece seals to the skin.

All respirators shall be sanitized, inspected and maintained in accordance with CSA Standard Z94.4-.02 after use on each shift, or more often as necessary, when issued exclusively for one worker, or after each use when used by more than one worker.

All records of respirator fit-Tests and training will be maintained by Occupational Health and Safety.

Compressed breathing air and air compressors used for supplied-air respirators or self-contained breathing apparatus shall comply with CSA Standard Z180.1-00.

All personnel required to use respirators are required to undergo an appropriate medical examination by a physician where there is doubt about the fitness or ability of the person to wear a respirator. The Safety Coordinator will inform Workplace Health when there is a question of fitness. This examination will be equivalent to the baseline examination defined in CSA Standard Z94.4-.02.

The physician will inform the Safety Coordinator whether or not a person has the fitness or ability to be assigned a task requiring the use of a respirator. Details of any medical examination will not be disclosed unless consent has been obtained from the person examined.

34.7.1 WHEN RESPIRATORY EQUIPMENT IS REQUIRED

Respiratory protective equipment is provided, where necessary, to protect employees from H2S. Workers must wear respiratory protective equipment when airborne contaminants exceed occupational exposure limits. If a worker is or might be exposed in a worksite to an air contaminant that exceeds an 8-hour TWA limit, ceiling limit or short-term exposure limit set by ACGIH for the air contaminant, Control Tech must provide an appropriate respirator and ensure that the worker uses it.

Where a worker is likely to be exposed to dust, fumes, gas, mist, aerosol, or vapour or any airborne contaminant that may be present in any amounts that are harmful or offensive to the worker, Control Tech shall provide an approved respiratory protective device for use by the worker that provides suitable and adequate protection to the worker from one or more airborne contaminants.

<u>Control Tech must consider:</u>

- The nature and exposure circumstances of any contaminants or biohazardous material,
- The concentration or likely concentration of any airborne contaminants,
- The duration or likely duration of the worker's exposure,
- The toxicity of the contaminants,
- The concentration of oxygen,
- The warning properties of the contaminants, and
- The need for emergency escape.

Additionally, during routine, temporary or emergency conditions an employee who is required or permitted to work in a place, including a work area where danger from toxic or corrosive gases may exist or evolve, where there is danger to health from harmful concentrations of gases, vapours, fumes, aerosol, mists or dusts, oxygen deficiency or any airborne contaminate that may be present in any amounts that are harmful or offensive to the employee, shall wear respiratory protective equipment appropriate to the circumstances.

34.7.2 How Respiratory Hazards are Assessed in the Workplace

For work performed at a client's location, Control Tech must ensure that employees observe posted respiratory hazard signage and implement controls as needed.

Control Tech shall identify and evaluate the respiratory hazards in the workplace during the hazard assessment process for each position in the company.

The evaluation shall include an employee's potential exposure to respiratory hazards and an identification of the contaminant's chemical composition and physical state. There will be a site specific respiratory hazard assessment conducted before any employee is exposed to respiratory hazards.

Most commonly used chemicals have safe limits or “permissible exposure limits” in the air that if exceeded will cause harm. The permissible exposure limits are listed in the legislation.

The best way to accurately determine the levels of chemicals or dust in the air is to complete air sampling.

Access points shall display signs warning that respiratory protection equipment is required and naming the contaminant or hazard involved. Where Control Tech cannot identify the exposure it shall take immediate precautions to protect a worker from immediate danger.

34.7.3 Respiratory Program Administrator Responsibilities and Duties

Overall responsibility for the respiratory protection program is assigned to the Control Tech Safety Manager in order to ensure that specific requirements are followed. This assignment is made, however, with the understanding that individual supervisors will have to implement and enforce major portions of the program. It is understood that the Program Administrator will report performance problems to the appropriate manager for resolution. The person who will have responsibility for administering all the aspects of this program will be the site manager.

<u>The responsibilities of the Program Administrator will include, but are not limited to:</u>

Conducting an assessment of the nature of airborne contaminants, the concentration or likely concentration of any airborne contaminants, the duration or likely duration of the employees exposure, the toxicity of the contaminants, the concentration of oxygen, the warning properties of the contaminates and the need for emergency escape.

Conducting an annual written evaluation of the program. The program evaluation should be completed no later than December, 31, of each year.

Ensuring an adequate supply of respirators, cartridges, and repair/replacement parts are always available at each work site. The Program Administrator may delegate this duty but will retain overall responsibility. The person(s) to whom this duty has been delegated is the site manager.

Ensuring that only respirators that have been approved ordered and used. Under no circumstances will respirators be used that have not been approved by current CSA standards.

Ensuring that all respirator users have been trained in the use, selection and limitations of the type of respirators they will be using prior to the first time the respirator must be used. While the duty of conducting the training may be delegated, the Program Administrator retains final responsibility for seeing that all employees are appropriately trained.

Ensuring that all respirator users have been medically evaluated and found fit to use the type of respirators that will be required in their job. The medical evaluation must be completed prior to assigning any employee to a task that requires use of a respirator.

Ensuring that all respirator users are fit-tested at least annually and more often if other local regulatory requirements apply.

Ensuring that respirators are individually issued, are cleaned and sanitized on a regular basis and respirators are stored in a clean and accessible location. This duty may also be delegated but the Program Administrator retains final responsibility for seeing that it is done.

Ensuring that employee exposure is monitored to assure correct respirator type is used. Exposure monitoring may be delegated to others; however, the Program Administrator has final responsibility of monitoring completion and to request assistance when necessary.

Ensuring surveillance of employees wearing respirators shall leave the area they are wearing respirators in to wash, change cartridges or if they detect break through or resistance with their PPE.

Ensuring that the elements of the Respiratory Protection Program for the selection, use, cleaning/maintenance, storage and fit-testing of respirators are followed.

Ensuring that respirator parts are not exchanged between brands of respirators.

Ensuring medical evaluations, respirators and required training are provided at no cost to the employee.

34.8 RESPIRATOR SELECTION CRITERIA

34.8.1 IDENTIFICATION OF RESPIRATORY HAZARDS

Respiratory protective equipment must be selected based on respiratory hazards.

The written program should describe the type of equipment that is used in the workplace, and the level of protection it affords.

In making a determination of what equipment to use, Control Tech must consider:

- the nature and exposure circumstances of any contaminants or biohazardous material
- the concentration or likely concentration of any airborne contaminants
- the duration or likely duration of the worker's exposure
- the toxicity of the contaminants
- the concentration of oxygen
- the warning properties of the contaminants
- the need for emergency escape

Common respiratory hazards that can be encountered include:

- Dust, Fumes, Gases,
- Chemical particles
- Oxygen Deficiency

To aid in the selection process the Control Tech safety manager will use the following to identify the proper respirator and filters or cartridges, where appropriate -

34.8.2 STANDARD FOR RESPIRATORS

Control Tech, in consultation with the worker and the occupational health and safety committee, if any, or the worker health and safety representative, if any, must select appropriate respiratory protective equipment in accordance with CSA Standard CAN/CSA-Z94.4-93, Selection, Use, and Care of Respirators.

34.8.3 CHARACTERISTICS OF HAZARDOUS OPERATION OR PROCESS

Hot operations - welding, chemical reactions, soldering, melting, melding and burning

Liquid operations - painting, degreasing, dipping, spraying, brushing, coating, etching, cleaning, pickling, plating, mixing, galvanizing and chemical reactions

Solid operations - pouring, mixing, separations, extraction, crushing, conveying, loading, bagging and demolition.

Pressurized spraying - cleaning parts, applying pesticides, degreasing, sand blasting and painting

Shaping operations - cutting, grinding, filing, milling, melding, sawing and drilling

34.8.4 NATURE OF HAZARD

Gaseous Contaminants

- Inert gases (helium, argon, etc.), which do not metabolize in the body but displace air to produce an oxygen deficiency.
- Acid gases (SO2, H2S, HCl, etc.) which are acids or produce acids by reaction with water.
- Alkaline gases (NH3, etc.), which are alkalies or produce alkalies by reaction with water.
- Organic gases (butane, acetone, etc.), which exist as true gases or vapours from organic liquids.
- Organometallic gases (tetraethyl lead, organo-phosphates, etc.), which have metals attached to organic groups.

Particulate contaminants

- Dusts are mechanically generated solid particulates (0.5 to 10µm)
- Fumes are solid condensation particles of small diameter (0.1 to 1.0 µm)
- Mists are liquid particulate matter (5 to 100 µm)
- Smoke is chemically generated particulates (solid and liquid) of organic origins (0.01 to 0.3 µm)

Concentration of Contaminant

The concentration of contaminant will determine the model and type of respirator and cartridges or filters to be used. The concentration is based on a sampling of the atmosphere.

Location of Hazardous Area

Confined Space, nearby contaminants, etc.

Employee Activity

Extreme heat, cold, welding hood requirement, etc.

34.9 RESPIRATOR STORAGE, CLEANING, INSPECTIONS MAINTENANCE AND REPAIR

Respiratory protective equipment kept ready to protect a worker is:

- stored in a readily accessible location
- stored in a manner that prevents its contamination
- maintained in a clean and sanitary condition
- inspected before and after each use to ensure it is in satisfactory working condition
- serviced and used in accordance with the manufacturer's specifications

34.9.1 RESPIRATOR INSPECTION

Inspection of compressed air cylinders must be done in accordance with CSA Standard CAN/CSA-Z94.4-02, Selection, Use, and Care of Respirators. Self-contained breathing apparatus, including regulators, must be serviced and repaired by qualified persons.

Control Tech shall ensure that any respiratory protective device for emergency use is thoroughly inspected by a competent person at least once a month and after each use. The date of every inspection made and the name of the person who made the inspection are recorded and conspicuously displayed at the location where the respiratory protective device is stored and any defects identified during the inspection carried out are corrected immediately by a competent person.

Control Tech shall ensure that respirators are inspected additionally as follows:

- All respirators used in routine situations shall be inspected by the employee before each use and during cleaning. A check by the employee of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters; and
- A check of elastomeric parts for pliability and signs of deterioration.

34.9.2 REPAIRS & MAINTENANCE

Respiratory protective equipment provided by Control Tech shall:

- be maintained, inspected, and tested by a qualified person
- where necessary to prevent a health hazard, be maintained in a clean and sanitary condition by a qualified person

Control Tech shall ensure that respirators that fail an inspection or are otherwise found to be defective are immediately removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

- Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's approved parts designed for the respirator;
- Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed.

Maintenance records for air supplying respirators, powered air purifying respirators and for sorbent cartridges and canisters will be maintained.

Respirator Maintenance Checklist

FACEPIECE	Cracks, tears, holes
	Facemask distortion
	Cracked or loose lenses or face shield
HEAD STRAPS	Breaks or tears
	Broken buckles
VALVES	Residue or dirt
	Cracks or tears in valve material
FILTERS/CARTRIDGES	Approval designation, labels intact
	Gaskets
	Cracks or dents in housing
	Proper cartridge for hazard

Cartridge Replacement Schedule

Respirator	Use	Schedule
3M 8210 N95	General particulate exposure; insulation block cutting; abrasive blasting	Use a new respirator for each new task
3M 8512 N95 welding fume respirator	Welding, brazing, or other particulate exposure	Use a new respirator daily
North 770030 Facepiece; 7583P100 Cartridges for organic vapors and acid gases	Painting, other organic solvents	For average use, replace cartridges weekly
		For heavy use, replace cartridges every 2 days
		For light use, replace cartridges every two weeks, max.

34.9.3 CLEANING AND DISINFECTING REQUIREMENTS

Respiratory protective equipment is properly cleaned and stored.

Where a worker is likely to be exposed to dust, fumes, gas, mist, aerosol or vapour or any airborne contaminant that may be present in any amounts that are harmful or offensive to the worker the respiratory protective device is regularly cleaned and maintained in an approved manner; and the respiratory protective device is kept, when not in use, in a convenient and sanitary location in which the respiratory protective device is not exposed to extremes of temperature or to any contaminant that may inactivate the respiratory protective device.

Control Tech shall ensure that respirators are cleaned and disinfected according to procedures recommended by the respirator manufacturer..

Respiratory equipment is not shared by employees, unless it is cleaned and sanitized before different employees use it. Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition. Respirators used in fit testing and training shall be cleaned and disinfected after each use.

Each individual who is assigned a cartridge respirator is responsible for seeing that the respirator is cleaned, inspected and properly stored.

<u>Cleaning Procedures</u>

1. Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm, preferably running water. Drain.
4. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in commercially available cleansers of equivalent disinfectant quality. Another alternative is to use wipes containing alcohol that are intended for use with respirators.
5. Rinse components thoroughly in clean, warm, preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

6. Components should be hand-dried with a clean lint-free cloth or air-dried and sanitized. Reassemble face piece, replacing filters, cartridges, and canisters where necessary. Test the respirator to ensure that all components work properly.

34.9.4 RESPIRATOR STORAGE

Respiratory protective equipment kept ready to protect a worker must be:

1. Stored in a readily accessible location,
2. Stored in a manner that prevents its contamination,
3. Maintained in a clean and sanitary condition,
4. Inspected before and after each use to ensure it is in satisfactory working condition, and
5. Serviced and used in accordance with the manufacturer's specifications.
6. Respirators should be stored in a readily accessible location in plastic, re-seal bags or in plastic tubs or bins with the users name clearly identified and are not exposed to extremes of temperature or to any contaminant that may inactivate it.
7. Respirators cannot be stored in tool boxes, on nails or in areas where they may become contaminated, distorted or otherwise damaged.
8. Respirators shall be maintained in clean and sanitary condition, inspected before and after use and serviced properly.
9. Respiratory protective equipment that is not used routinely but is kept for emergency use is inspected at least once every calendar month by a competent employee to ensure it is in satisfactory working condition.

34.10 MEDICAL REQUIREMENTS

34.10.1 GENERAL

Control Tech shall provide a medical evaluation to determine the employee's ability to use a respirator, *before* the employee is fit tested or required to use the respirator in the workplace. Control Tech may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

34.10.2 MEDICAL EVALUATION PROCEDURES

Control Tech shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire. The medical evaluation shall obtain the information requested by the Medical Questionnaire in Forms section (or equivalent).

34.10.3 RECORDKEEPING

The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. Records of medical evaluations required by this section must be retained and made available in accordance with regulatory requirements. Records will be treated confidentially and maintained on file in the Control Tech corporate office by the Safety Manager.

34.10.4 MEDICAL DETERMINATION

In determining the employee's ability to use a respirator, Control Tech shall obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

- Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
- The need, if any, for follow-up medical evaluations; and
- A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

All recommendations are to be sent to the Control Tech Safety Manager.

34.11 RESPIRATOR FIT TESTING AND EFFECTIVE FACIAL SEAL OF RESPIRATORY PROTECTIVE EQUIPMENT

Users of respiratory protective equipment must be properly fit tested. A respirator which requires an effective seal with the face for proper functioning must not be issued to a worker unless a fit test demonstrates that the face piece forms an effective seal with the wearer's face.

Fit tests must be performed in accordance with procedures in CSA Standard CAN/CSA-Z94.4-02, Selection, Use and Care of Respirators. A fit test must be carried out:

- before initial use of a respirator,
- at least once a year,
- whenever there is a change in respirator face piece, including the brand, model, and size, and
- whenever changes to the user's physical condition could affect the respirator fit

Other personal protective equipment that is to be worn at the same time as a respirator and which could interfere with the respirator fit must be worn during a fit test.

Control Tech provides suitable and adequate approved respiratory protective devices for use by the worker from one or more airborne contaminants; with a face piece that is the proper size and where a tight fit is essential to the proper functioning of the respiratory protective device, makes an effective seal to the facial skin of the worker.

Where a tight fit is essential to ensure the worker is not exposed to an extent that may pose a risk of significant harm to the worker, the worker has been fit-tested by a competent person in an approved manner.

Control Tech must maintain a record of fit test results.

34.11.1 EFFECTIVE FACIAL SEAL OF RESPIRATORY PROTECTIVE EQUIPMENT

A worker required to wear a respirator which requires an effective seal with the face for proper functioning must be clean shaven where the respirator seals with the face. Before each use of a respirator which requires an effective seal with the face for proper functioning, a worker must perform a positive or negative pressure user seal check in accordance with CSA Standard CAN/CSA-Z94.4-02, Selection, Use, and Care of Respirators.

34.11.2 FIT TEST PROCEDURES

The requirements in this section apply to all accepted fit test methods, both QLFT and QNFT.

The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator sizes so that the respirator is acceptable to, and correctly fits, the user.

Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

The test subject shall be instructed to hold each chosen face piece up to the face and eliminate those that obviously do not give an acceptable fit.

The more acceptable face pieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort.

Assistance in assessing comfort can be given by discussing the following points:

- If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
- Position of the mask on the nose
- Room for eye protection
- Room to talk
- Position of mask on face and cheeks

The following criteria shall be used to help determine the adequacy of the respirator fit:

- Chin properly placed;
- Adequate strap tension, not overly tightened;
- Fit across nose bridge;
- Respirator of proper size to span distance from nose to chin;
- Tendency of respirator to slip;
- Self-observation in mirror to evaluate fit and respirator position.

34.11.3 CONDUCTING A POSITIVE OR NEGATIVE PRESSURE TEST (SEAL CHECK)

Before each use of a respirator which requires an effective seal with the face for proper functioning, the employee must perform a positive or negative pressure user seal check in accordance with the latest CSA Standard - CAN/CSA-Z94.4-02, Selection, Use, and Care of Respirators.

If after passing a QLFT or QNFT, the employee subsequently notifies Control Tech, Program Administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator face piece and to be retested.

The fit test shall be administered using an accepted QLFT or QNFT protocol. The accepted QLFT and QNFT protocols and procedures are contained in this section.

QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. Half face air filtering respirators may be fit tested with irritant smoke while full face air filtering respirators require Portacount fit testing.

If the fit factor, as determined through an QNFT protocol, is equal to or greater than 100 for tight-fitting half face pieces, or equal to or greater than 500 for tight-fitting full face pieces, the QNFT has been passed with that respirator.

Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual face piece into a negative pressure respirator with appropriate filters, or by using an identical

negative pressure air-purifying respirator face piece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator face piece.

Quantitative fit testing of these respirators shall be accomplished by modifying the face piece to allow sampling inside the face piece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate face piece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the face piece.

Any modifications to the respirator face piece for fit testing shall be completely removed, and the face piece restored to CSA approved configuration, before that face piece can be used in the workplace.

34.11.4 USE THE FIT TEST FORM.

User Seal Check

Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. The test subject shall conduct a user seal check, either the negative or positive pressure seal checks described below -

Positive Pressure Check

Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

Negative Pressure Check

Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface, such as stubble beard growth, beard, moustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed, including glasses.

If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

Test Exercises

Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. If due to medical or health conditions the employee cannot perform the test exercises the fit test shall not be performed and the employee not allowed to use a respirator until all elements of the fit test can be achieved.

The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

The following test exercises are to be performed for all fit testing methods prescribed in this procedure:

1. Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
2. Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
3. Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.
4. Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
5. Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject shall read from the Rainbow Passage
6. Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)
7. Jogging in place. The test subject shall jog in place being careful to be aware of their surroundings.
8. Normal breathing. Same as exercise (1).

34.11.5 QUALITATIVE FIT TEST (QLFT) PROTOCOLS

Control Tech shall ensure that persons administering QLFT are qualified to do so. Qualified people are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order. Control Tech shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

Irritant Smoke (Stannic Chloride) Protocol.

This qualitative fit test uses a person's response to the irritating chemicals released in the ``smoke'' produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

General Requirements and Precautions.

The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

Only stannic chloride smoke tubes shall be used for this protocol. No form of test enclosure or hood for the test subject shall be used.

The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

Sensitivity Screening Check.

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 millilitres per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall *carefully direct a small amount* of the irritant smoke in the test subject's direction to determine that he/she can detect it.

Irritant Smoke Fit Test Procedure

The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

The test subject shall be instructed to keep his/her eyes closed if wearing a half face respirator.

The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the face piece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

The exercises identified in the Test Exercises of this procedure shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

If a response is produced during this second sensitivity check, then the fit test is passed. The glass tube shall be disposed of properly.

34.11.6 QUANTITATIVE FIT TEST (QNFT) PROTOCOLS

Using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a face piece to quantify the respirator have been demonstrated to be acceptable.

Control Tech shall ensure that persons administering QNFT are qualified to do so. Qualified people are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

Control Tech shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

Portacount Fit Test Requirements

Check the respirator to make sure the respirator is fitted with a high-efficiency filter and that the sampling probe and line are properly attached to the face piece.

Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

Check the following conditions for the adequacy of the respirator fit - Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting face piece, try another size of the same model respirator, or another model of respirator.

Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

The test subject shall be instructed to perform the exercises in Test Exercises section of this procedure.

After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

Portacount Test Instrument

The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance.

A record of the test needs to be sent to the safety manager and kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

34.12 WORKPLACE MONITORING

A program of monitoring potential employee exposures has been implemented through the corporate health and safety department. Project personnel may also be assigned with the task of conducting air monitoring. Direct-reading instruments will also be used in the characterization of potential exposures. All the data collected is used to determine the appropriateness of the respiratory equipment.

34.12.1 EMERGENCY PLANNING

When employees may be exposed to or confined in a noxious, toxic or oxygen-deficient atmosphere, Control Tech shall ensure that there shall be available during working hours a qualified supplier of emergency response providers trained in rescue procedures who have access to breathing apparatus which will enable them to effectively carry out rescue procedures.

34.12.2 RECORDS

Control Tech must maintain a record of fit test results and worker instruction, maintenance for air supplying respirators, powered air purifying respirators, for sorbent cartridges and canisters and maintenance and repairs for each self-contained breathing apparatus and all air cylinders in accordance with the requirements of CSA Standard CAN/CSA-Z94.4-02, Selection, Use and Care of Respirators.

34.12.3 PROGRAM EVALUATION

Control Tech shall conduct annual evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

Control Tech shall regularly consult employees required to use respirators to assess the employees' views on this program's effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

- Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
- Appropriate respirator selection for the hazards to which the employee is exposed;
- Proper respirator use under the workplace conditions the employee encounters; and
- Proper respirator maintenance.

35.0 RIGGING

35.1 PURPOSE

This program outlines the procedures for safe operations and the training requirements regarding rigging equipment. The material in this document does not take precedence over applicable government legislation which all employees must follow.

35.2 SCOPE

This program applies to all workers of Control Tech, temporary workers and any contractors working for Control Tech.

When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech workers and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

35.3 RESPONSIBILITIES

Managers and Supervisors

Are responsible to ensure that workers and contractors are trained and qualified on the proper operations and have been trained in rigging safety by a competent person. Modifications or additions which affect the safe operation of the equipment may only be made with the manufacturer's written approval.

Are responsible to see that all provisions of this program are followed and that rigging inspections are performed and the equipment is in safe operating condition.

Employees

Employees are responsible to follow the requirements of this program and report any damage or needed repairs immediately to their supervisor.

35.4 OPERATIONAL PROCEDURES

All rigging work shall be assembled, used, maintained and dismantled under the direct supervision of a competent and qualified workers trained in safe rigging practices, in accordance with manufacturer's specifications and with the code of signals authorized by local regulatory guidelines for controlling hoisting operations.

Rigging and slinging work may only be performed by competent workers. Rigging and slinging work must be done by or under the direct supervision of qualified workers familiar with the rigging to be used and with the code of signals authorized by the Board for controlling hoisting operations.

- Never overload a rope. Apply the design factor of 5 (10 for ropes used to support or hoist personnel). Then make further allowances for the rope's age and condition.
- Never drag a rope along the ground. Abrasive action will wear, cut, and fill the outside surfaces with grit.
- Never drag a rope over rough or sharp edges or across itself. Use softeners to protect rope at the sharp comers and edges of a load.
- Avoid all but straight line pulls with fibre rope. Bends interfere with stress distribution in fibres.
- Always use thimbles in rope eyes. Thimbles cut down on wear and stress.
- Keep sling angles at more than 45°. Lower angles can dramatically increase the load on each leg. The same is true with wire rope slings.

- Loads to be unhooked by a worker must be safely landed and supported before the rigging is detached
- Except as otherwise specified by this program or other local regulatory requirements, the maximum rated load of chains, attachments and other rigging equipment shall be warranted by the manufacturer of the equipment, or by a professional engineer, or by other persons whose qualifications are acceptable to the designated local governmental official or department.
- All slings used to hoist a load and the slings fittings and attachments must be in compliance with legislated standards and capable of supporting at least 10 times the load to which the slings fittings, and attachments may be subjected where they are used to support a worker, and at least five times the maximum load to which they may be subjected in any other case.
- No shackles shall be subjected to a load greater than the maximum load indicated on the shackle, and all shackle pins are installed to prevent accidental withdrawal, and a bolt is never used in the place of a properly fitted shackle pin.
- Never use fibre rope near welding or flame cutting. Sparks and molten metal can cut through the rope or set it on fire.
- Keep fibre rope away from high heat. Don't leave it unnecessarily exposed to strong sunlight, which weakens and degrades the rope.
- Never couple left-lay rope to right-lay.
- When coupling wire and fibre ropes, always use metal thimbles in both eyes to keep the wire rope from cutting the fibre rope.
- Make sure that fibre rope used with tackle is the right size for the sheaves. Sheaves should have diameters at least six – preferably ten – times greater than the rope diameter.
- All hooks shall have a safety latch, mousing, or shackle if the hook could cause injury if it is dislodged while in use.
- Where a worker may be endangered by the rotation or motion of a load during hoisting one or more tag lines must be used to control the rotation or motion of the load and the tag lines will be of sufficient length to protect the workers from any overhead hazard and the tag lines are not removed from the load until the load is securely landed.

35.4.1 RIGGING BREAKING STRENGTH AND LOAD RATING

Control Tech may use a dedicated rigging assembly designed and certified for a particular lift or project by a professional engineer but the dedicated rigging assembly must be re-rated before it is used for another lift or project.

The rigger must be aware of the capacity of the rigging equipment and ensure that it is not exceeded.

The safe working load must be clearly marked on rigging equipment. Rigging fittings must be marked with the manufacturer's identification, product identifier, and the working load limit or sufficient information to readily determine the WLL.

A wire rope sling with a swaged or poured socket or a pressed fitting must be permanently identified with:

- its working load limit
- the angle upon which the WLL is based
- the name or mark of the sling manufacturer

An alloy steel chain sling must be permanently identified with:

- the size
- the manufacturer's grade and the WLL
- the length and number of legs
- the name or mark of the sling manufacturer

Synthetic fibre web slings must be permanently identified with the:

- manufacturer's name or mark
- manufacturer's code or stock number
- working load limits for the types of hitches permitted
- type of synthetic web material

A metal mesh sling must be permanently identified with:

- the manufacturer's name or mark
- the WLL for vertical basket hitch and choker hitch configurations

Control Tech must ensure that the maximum load rating of the rigging, as determined by the rigging manufacturer or a professional engineer, is legibly and conspicuously marked on the rigging. If it is not practicable to mark the rigging, Control Tech must ensure the maximum load rating of the rigging is available to the workers at the work site.

The rated capacity of rigging equipment must not be exceeded. The load applied to any rigging or rigging assembly must not exceed the working load limit. The determination of the working load limit of a sling assembly must ensure that the WLL of any individual component of the assembly is not exceeded.

Control Tech may use a dedicated rigging assembly designed and certified for a particular lift or project by a professional engineer but the dedicated rigging assembly must be re-rated before it is used for another lift or project.

Control Tech must ensure that the maximum load rating of the rigging as determined by the rigging manufacturer or a professional engineer is legibly and conspicuously marked on the rigging. If it is not practicable to mark the rigging, Control Tech must ensure the maximum load rating of the rigging is available to the workers at the work site.

35.4.2 RIGGING A LOAD

- Determine the weight of the load - do not guess.
- Determine the proper size for slings and components.
- Do not use manila rope for rigging.
- Ensure that shackle pins and shouldered eyebolts are installed in accordance with the manufacturer's recommendations.
- Ensure that ordinary (shoulderless) eyebolts are threaded in at least 1.5 times the bolt diameter.
- Use safety hoist rings (swivel eyes) as a preferred substitute for eye bolts wherever possible.
- Pad sharp edges to protect slings.
- Remember that machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under several tons of load.
- Wood, tire rubber, or other pliable materials may be suitable for padding.
- Do not use slings, eyebolts, shackles, or hooks that have been cut, welded, or brazed.
- Install wire-rope clips with the base only on the live end and the U-bolt only on the dead end.
- Follow the manufacturer's recommendations for the spacing for each specific wire size.
- Determine the center of gravity and balance the load before moving it.
- Initially lift the load only a few inches to test the rigging and balance.

35.4.3 KNOTS

Wherever practical, avoid tying knots in rope. Knots, bends, and hitches reduce rope strength considerably. Just how much depends on the knot and how it is applied. Use a spliced end with a hook or other standard rigging hardware such as slings and shackles to attach ropes to loads.

In some cases, however, knots are more practical and efficient than other rigging methods, as for lifting and lowering tools or light material.

For knot tying, a rope is considered to have three parts:

- End
- Bight
- Standing part

The end is where you tie the knot. The standing part is inactive. The bight is in between.

Following the right sequence is essential in tying knots. Equally important is the direction the end is to take and whether it goes over, under, or around other parts of the rope.

WARNING – When tying knots, always follow the directions over and under precisely. If one part of the rope must go under another, do it that way. Otherwise an entirely different knot – or no knot at all – will result. Once knots are tied, they should be drawn up slowly and carefully to make sure that sections tighten evenly and stay in proper position.

Bowline

Never jams or slips when properly tied. A universal knot if properly tied and untied. Two interlocking bowlines can be used to join two ropes together. Single bowlines can be used for hoisting or hitching directly around a ring.

Used to tie a bowline in the middle of a line or to make a set of double-leg spreaders for lifting pipe.

Pipe Hitch

Reef or Square Knot

Can be used for tying two ropes of the same diameter together. It is unsuitable for wet or slipper ropes and should be used with caution since it unties easily when either free end is jerked. Both live and dead ends of the rope must come out of the loops at the same side.

Two Half Hitches

Two half hitches, which can be quickly tied, are reliable and can be put to almost any general use.

Running Bowline

The running bowline is mainly used for hanging objects with ropes of different diameters. The weight of the object determines the tension necessary for the knot to grip.

1. Make an overhand loop with the end of the rope held toward you
2. Hold the loop with your thumb and fingers and bring the standing part of the rope back so that it lies behind the loop
3. Take the end of the rope in behind the standing part, bring it up, and feed it through the loop
4. Pass it behind the standing part at the top of the loop and bring it back down through the loop

Figure-Eight Knot

This knot is generally tied at the end of a rope to temporarily prevent the strands from fraying. The figure-eight knot can be tied simply and quickly and will not jam as easily as the overhand knot. It is also larger, stronger, and

does not injure the rope fibres. The figure-eight knot is useful in preventing the end of a rope from slipping through a block or an eye.

1. To tie the figure-eight knot, make an underhand loop
2. Bring the end around and over the standing part
3. Pass the end under and then through the loop
4. Draw up tight

35.4.4 SIGNALING

Signals to the operator shall be in accordance with the standard hand signals prescribed by the applicable standard for the type of equipment. Specific requirements include:

- Each movement of equipment shall be proceeded by distinctive signals clearly discernible to all workers endangered by the movement and clearly distinguishable by the operator of the equipment controlled, and a signal which is not understood clearly by the operator of equipment shall be acted upon by him or her as though it were a stop signal.
- A worker shall not cause a signal to be given for the movement of equipment unless he or she has ensured that he or she and all workers within the area for which he or she is responsible are not endangered by the movement.
- Only a designated worker shall cause a signal to be given for the movement of equipment, but workers may cause a stop signal to be given and this signal shall be obeyed promptly and without question.
- A worker designated to direct the movement of equipment shall not be otherwise occupied while the equipment is in motion and he or she shall be prepared to signal to stop during the motion.
- A signaling device that functions unreliably or in a way that might constitute a hazard to a worker shall be removed from service immediately.
- Signals shall be discernible or audible at all times.
- Some special operations may require addition to or modification of the basic signals.
- For all such cases, these special signals shall be agreed upon and thoroughly understood by both the person giving the signals and the operator, and shall not be in conflict with the standard signals.

35.5 INSPECTION AND REJECTION CRITERIA

Pre-use inspections are completed before rigging is used. Slings and attachments must be visually inspected before use on each shift, and defective equipment must be immediately removed from service.

Control Tech must ensure that rigging to be used during a work shift is inspected thoroughly prior to each period of continuous use during the shift to ensure that the rigging is functional and safe.

Wire Rope Inspection

It is essential to have a well-planned program of regular inspection carried out by an experienced inspector.

All wire rope in continuous service should be checked daily during normal operation and inspected on a weekly basis. A complete and thorough inspection of all ropes in use must be made at least once a month. Rope idle for a month or more should be given a thorough inspection before it is returned to service.

A record of each rope should include date of installation, size, construction, length, extent of service and any defects found.

The inspector will decide whether the rope must be removed from service. His decision will be based on:

1. details of the equipment on which the rope has been used
2. maintenance history of the equipment
3. consequences of failure

4. experience with similar equipment

Conditions such as the following should be looked for during inspection.

Wire rope must be permanently removed from service if:

- In running wire ropes, there are 6 or more randomly distributed wires broken in one rope lay or 3 or more wires are broken in one strand in one lay
- In stationary wire ropes, such as guy-lines, there are 3 or more broken wires in one lay in sections between end connections, or more than one broken wire within one lay of an end connection
- Wear, or the effects of corrosion, exceed 1/3 of the original diameter of outside individual wires there is evidence of kinking, bird-caging or any other damage resulting in distortion of the rope structure
- There is evidence of heat or arc damage
- There are reductions of normal rope diameter, from any cause, in excess of 0.4 mm (1/64 in) for diameters up to and including 8 mm (5/16 in), 1 mm (3/64 in) for diameters greater than 8 mm (5/16 in) up to and including 19 mm (3/4 in), 2 mm (1/16 in) for diameters greater than 19 mm (3/4 in) up to and including 29 mm (1 1/8 in), or 3 mm (3/32 in) for diameters greater than 29 mm (1 1/8 in).

Hook Inspection

A worn or damaged hook must be permanently removed from service if:

- the throat opening, measured at the narrowest point, has increased by more than 15% of the original opening
- the hook has twisted more than 10° from the original plane of the hook
- the hook has lost 10% or more of its cross-sectional area
- the hook is cracked or otherwise defective
- wear or damage exceeds any criteria specified by the manufacturer

Chain Sling Inspection

A competent worker should check chain slings for nicks and gouges that may cause stress concentrations and weaken links. Any repairs must be done according to manufacturers' specifications.

Never use repair links or mechanical coupling links to splice broken lengths of alloy steel chain. They are much weaker than the chain links. Never use a chain if the links are stretched or do not move freely.

A chain sling must be permanently removed from service:

A chain sling must be permanently removed from service or repaired by a qualified person to the original manufacturer's specification or to the specifications of a professional engineer if the chain has defects such as stretch or deformation, cracks, nicks or gouges, corrosion pits or burned links. A chain sling must be permanently removed from service when the chain link wear is more than the maximum allowed by the manufacturer.

Synthetic Fibre Web Sling Inspection

A synthetic fibre web sling must be removed from service when any of the following circumstances occurs:

- the length of an edge cut exceeds the web thickness
- the penetration of abrasion exceeds 15% of the webbing thickness taken as a proportion of all plies
- abrasion occurs on both sides of the webbing and the sum of the abrasion on both sides exceeds 15% of the webbing thickness taken as a proportion of all plies
- warp thread damage up to 50% of the sling thickness extends to within 1/4 of the sling width of the edge or exceeds 1/4 the width of the sling
- warp thread damage to the full depth of the sling thickness extends to within 1/4 of the sling width of the edge or the width of damage exceeds 1/8 the width of the sling

- weft thread damage allows warp thread separation exceeding 1/4 the width of the sling and extends in length more than twice the sling width
- any part of the sling is melted or charred, or is damaged by acid or caustic
- stitches in load bearing splices are broken or worn
- end fittings are excessively pitted or corroded, cracked, distorted or broken
- a combination of the above types of damage of approximately equal total effect are present

A metal mesh sling must be removed from service if any of the following damage is visible:

- a broken weld or a broken brazed joint along the sling edge
- a broken wire in any part of the mesh
- reduction in wire diameter of 25% due to abrasion or 15% due to corrosion
- lack of flexibility due to distortion of the mesh
- distortion of the choker fitting so that the depth of the slot is increased by more than 10%
- distortion of either end fitting so that the width of the eye opening is decreased by more than 10%
- a 15% reduction of the original cross-sectional area of metal at any point around the hook opening or end fitting
- visible distortion of either end fitting
- a cracked end fitting

35.5.1 STORAGE

- Store fibre ropes in a dry cool room with good air circulation – temperature 10-21°C (50-70°F) humidity 40-60%.
- Hang fibre ropes in loose coils on large diameter wooden pegs well above the floor.
- Protect fibre ropes from weather, dampness, and sunlight. Keep them away from exhaust gases, chemical fumes, boilers, radiators, steam pipes, and other heat sources.
- Let fibre ropes dry before storing them. Moisture hastens rot and causes rope to kink easily. Let a frozen rope thaw completely before you handle it. Otherwise fibres can break. Let wet or frozen rope dry naturally.
- Wash dirty ropes in clean cool water and hang to dry.

35.6 TRAINING

Training shall include:

- Documentation of worker, date of training and subject matter, including method used to test knowledge of material.
- No worker shall operate cranes or equipment covered by this program until training has been complete and management has approved and designated him or her as a qualified operator.

36.0 SCAFFOLDS / TEMPORARY WORK PLATFORMS

36.1 PURPOSE

The purpose of this program is to prevent injuries due to falls from elevated work areas and ensure workers are able to safely use and inspect scaffolding materials and erected scaffolds. Control Tech must ensure that scaffolds used by workers are in a safe condition and are able to withstand the load, regardless of who erected the scaffold ensuring compliance with the OHS legislation. The material in this document does not take precedence over applicable government legislation which all employees must follow.

36.2 SCOPE

This procedure applies to all workers.

When work is performed on a non-owned or operated site, the client's program shall take precedence and shall be abided by. However, this document covers Control Tech workers and contractors and shall be used on owned premises, or when a client's program doesn't exist or is less stringent.

36.3 RESPONSIBILITIES

Managers and Supervisors

- Responsible for ensuring that scaffolds are erected by a qualified person, that set up inspections are performed, and all daily inspections are performed before work starts for the day.
- Responsible for ensuring that all workers, and/or contractors have been trained in the use and inspection methods for scaffolds.
- Responsible for ensuring that all workers and contractors are aware that if an inspection discovers a defect, the scaffold cannot be used until repairs are made.
- Must ensure that only competent persons maintain and inspect an aerial device, elevating work platform, suspended powered platform, personnel lifting unit or scaffold.

Employees

- Responsible for following this program by inspecting the scaffolds daily and report any damages or repairs that may be needed to their supervisor.

36.4 DEFINITIONS

Bearer - A horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.

Brace - A tie that holds one scaffold member in a fixed position with respect to another member.

Coupler - A device for locking together the components of a tubular metal scaffold which shall be designed and used to safely support the maximum intended loads.

Double pole or independent pole scaffold - A scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

Guardrail - A rail secured to uprights and erected along the exposed sides and ends of platforms.

Heavy Duty Scaffold - A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.

Ledger (stringer) - A horizontal scaffold member which extends from post to post and which supports the putlogs or bearer forming a tie between the posts.

Light Duty Scaffold - A scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.

Manually Propelled Mobile Scaffold - Manually propelled mobile scaffold.

Maximum intended load - The total of all loads including the working load, the weight of the scaffold, and such other loads as may be reasonably anticipated.

Medium duty scaffold - A scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.

Mid-Rail - A rail approximately midway between the guardrail and platform, used when required, and secured to the uprights erected along the exposed sides and ends of platforms.

Scaffold - Any temporary elevated platform and its supporting structure used for supporting workmen or materials or both.

Toe board - A barrier secured along the sides and ends of a platform, to guard against the falling of material.

Tube and coupler scaffold - An assembly consisting of tubing, which serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and special couplers which serve to connect the uprights and to join the various members.

Tubular welded frame scaffold - A sectional, panel, or frame metal scaffold substantially built up of prefabricated welded sections that consist of posts and horizontal bearer with intermediate members. Panels or frames shall be braced with diagonal or cross braces.

Working Load - Load imposed by workers, materials, and equipment.

36.5 PROCEDURES

36.5.1 GENERAL REQUIREMENTS

Control Tech scaffolds meet CSA Standards. Control Tech must ensure that scaffolds erected to provide working platforms during the construction, alteration, repair or demolition of buildings and other structures comply with CSA Standard S269.2-M87 (R2003), Access Scaffolding for Construction Purposes (or current version).

Persons on elevating work platforms must use fall arrest equipment. A person on an elevating work platform must wear a personal fall arrest system secured to a suitable and substantial anchorage point.

Scaffolds shall only be erected by a qualified third party who is competent to certify the scaffolding safe to use or by a competent worker who shall supervise the erection, alteration and dismantling of a scaffold.

The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose boards shall not be used to support scaffolds or planks.

Control Tech shall send to the Commission all plans including the installation and disassembling procedures signed and sealed by an engineer of the manufacturer, respecting:

- the shoring of an excavation or trench 6 metres or deeper
- the shoring of concrete formwork
- any wood scaffolding 9 metres or more in height
- any metal scaffolding 18 metres or more in height

- any outrigger scaffolding or suspended outrigger scaffolding extending out more than 2,4 metres from the finished face of a building
- any temporary runway or platform designed to support workers and that is part of the forms
- any platform, bucket or basket attached to a hoisting device for the transport of persons
- any scaffolding used or installed on a vehicle or any equipment which may be moved
- any anchoring device used for the installation of prefabricated concrete slabs or prefabricated buildings
- any spreader bar used for the installation of prefabricated concrete slabs or prefabricated buildings
- any suspended scaffolding or boatswain's chair

36.5.2 ASSEMBLY UTILIZATION AND MAINTENANCE

The platform of each scaffold must:

- be a minimum nominal width of 50 cm (20 in), except that a nominal 30 cm (12 in) wide work platform may be used with ladder jacks, pump jack or similar systems
- not leave more than one opening in the work platform, which must be no greater than 25 cm (10 in) in width
- if not level, be designed to ensure adequate footing for workers using the platform

Types of scaffolding include:

- Outrigger scaffolding
- Suspended scaffolding: Standard CAN3-Z271-M84 Safety Code for Suspended Powered Platforms.
- Boatswain's chair: Standard CAN3-Z271-M84 Safety Code for Suspended Powered Platforms
- Ladder jack scaffolding
- Mobile scaffolding
- Metal scaffolding
- Suspended scaffolding used by bricklayers

36.5.3 UTILIZATION

Control Tech shall see that no one works on scaffolding:

- which does not conform to the safety requirements,
- during a storm or a high wind period or
- when the platform is covered with ice, snow or sleet, unless the surface has been covered with an anti-slip substance

Workers shall not work on scaffoldings with different levels unless protection has been provided over those working below in order to stop tools or other objects which may fall from a higher level.

A hoisting apparatus forming part of the installation shall be installed and operated according to the manufacturer's instructions.

In assembling metal scaffolding, it is prohibited to use any piece that has been reformed or straightened in such a way that its strength is diminished.

No vehicle or equipment which can be moved and on which scaffolding is installed or erected, may be moved when a worker is on the scaffolding.

Scaffold deck boards shall be cleated, wired or nailed into place.

All working levels of scaffolds will be floored completely except where internal ladders require space for ladder openings.

Scaffolds and other devices mentioned or described in this program shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are occupied.

Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.

Load limits for temporary work platforms must not be exceeded. Each work platform must have sufficient strength to bear the load to be placed on it. Control Tech must ensure that scaffolds used by workers are in a safe condition and are able to withstand the load, regardless of who erected the scaffold.

A scaffold used to carry the equivalent of an evenly distributed load of more than 367 kilograms per square metre will be designed and certified by a professional engineer, and constructed, maintained, and used in accordance with the certified specifications. All workers on a scaffold are informed of the maximum load that the scaffold is permitted to carry.

Bolts used in the construction of scaffolds shall be of adequate size and in sufficient numbers at each connection to develop the designed strength of the scaffold. All connections between the parts of a scaffold must be secure.

All platforms shall be overlapped and secured from any movement. An access ladder or equivalent safe access shall be provided.

Scaffold planks shall extend over their end supports not less than 6 inches or more than 18 inches.

A scaffold must be erected with the vertical members plumb, and with the ledgers and bearers level. The base of a scaffold must have bearing plates or sills that rest on a solid surface and are sufficient to support the weight of the scaffold. The poles, legs and uprights of a scaffold must be securely and rigidly braced to prevent movement.

Materials being hoisted onto a scaffold shall have a tag line. Overhead protection shall be provided for workers on a scaffold exposed to overhead hazards.

Work shall not be performed on a scaffold during storms or high winds.

A scaffold must be effectively grounded if it is a metal scaffold and is located close to a high voltage energized electrical conductor or equipment, and a hazardous level of electrical charge is likely to be induced in the scaffold.

Work shall not be performed on scaffolds that are covered with snow or ice, unless all snow and ice has been removed and all planking has been sanded to prevent slipping. Tools, material, and debris shall not be allowed to accumulate in quantities to cause a hazard.

36.5.4 INSPECTIONS

Scaffoldings shall be inspected before use by a competent person and that they are not used if defects are found:

- To ensure that the scaffold planks are free of defects before the planks are incorporated into a scaffold. Control Tech may use a manufactured scaffold plank if the plank is used according to the manufacturer's recommendations and the manufactured scaffold plank is clearly marked with its maximum working load or the load specifications are readily available at the worksite.
- To ensure that where a metal scaffold is used it is inspected by a competent person prior to use and daily when in use for any damage, deterioration or weakening of the scaffold or the scaffolds components.
- Following any failure of the material;
- After any abnormal pressure or any incident which might have adversely affected the structure; and
- When re-used after any length work interruption.

- At a minimum, the following shall be inspected after erection, before the start of the day or beginning of a shift change:
    - Ground or surface footing shall be inspected to ensure that there is no settling.
    - All main supports and cross braces shall be inspected for any signs of damage, missing pins, bolts and any locks and/or safety keepers.
    - All walking surfaces and/or planks shall be inspected for damage and proper placements and any possible movement.
    - All walkways and planks must be secure to prevent any movement.
- Inspection shall be made to ensure that the scaffold is stable and any movement is prevented.
- If a metal scaffold or a component of a metal scaffold is damaged, deteriorated or weakened so that the strength or stability of the scaffold is affected, Control Tech shall ensure that the scaffold is not used until the scaffold or component is repaired or replaced by a competent person in accordance with the manufacturers or a professional engineers specifications and recommendations. Additionally, if during the inspection, a defect or damage to the scaffold is discovered, the scaffold shall be tagged out and use prohibited until needed repairs are made.
- Control Tech must keep records of inspection, maintenance, repair or modification for each elevating work platform, swing stage and permanent powered platform.

36.5.5 SIGNS AND TAGS

Signs and tags shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazards no longer exist.

Defective equipment shall be tagged out by using a weather resistant tag secured to the scaffolding structure on all four sides.

Danger signs shall be used only where an immediate hazard exists. Danger signs must be posted around the immediate area of the scaffold, to alert other workers of possible danger from falling objects from the scaffold.

Caution Signs and/or barricade tape shall be used to mark off a larger area around scaffolding warning other workers to use caution.

Tags – Scaffold entry points are marked with color coded tags. Control Tech must ensure that a scaffold is colour coded using tags at each point of entry indicating its status and condition as follows - a green tag with “Safe for Use”, or similar wording, to indicate it is safe for use, a yellow tag with “Caution: Potential or Unusual Hazard”, or similar wording, to indicate the presence of a potential or unusual hazard or a red tag with “Unsafe for Use”, or similar wording, to indicate it is not safe to use.

36.5.6 MODIFICATIONS

Modification and repairs shall be performed by a qualified person, who is competent to certify the scaffolding safe to use.

Employees shall not perform any modifications or repairs, unless they have been trained and certified, failure to comply may result in disciplinary action and or termination.

36.5.7 MATERIALS

Materials used for scaffolding shall be free from any defects which might impair their resistance.

The lumber used for scaffolding shall be in good condition, composed of long non-breaking fibres and free from any defect which might impair its strength; of a quality equivalent to No 1 spruce; barked, if it is rough timber, and without paint or any opaque coating.

The metal parts of a scaffold shall not be weakened neither by rust, nor by any corrosive material and if tubular elements are used, not be weakened by the effects of cold or heat.

36.5.8 ERECTION AND DISMANTLING

The erection and dismantling of scaffoldings shall be performed:

- Under the supervision and control of a qualified person.
- With all safety measures taken to prevent objects from falling.
- Using tools appropriate to the type of scaffolding and being placed at the disposal of the workers.
- No scaffolding shall be left in such a state that it may create a hazard.

36.6 TRAINING REQUIREMENTS

The supervisor shall have each worker who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. The training shall include the following areas, as applicable:

- The nature of any electrical hazards, fall hazards and falling object hazards in the work area.
- The proper use of the scaffold, and the proper handling of materials on the scaffold.
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used.
- The maximum intended load and the load-carrying capacities of the scaffolds used.
- Workers are made aware of the recognition and use of scaffold tags. A worker must not use a scaffold if it has a red tag, a green or yellow tag that has expired, or no tag at all.

The supervisor shall have each worker who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a competent person to recognize any hazards associated with the work in question.

- The training shall include the following topics, as applicable:
- The nature of scaffold hazards.
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in use.
- The design criteria, maximum intended load-carrying capacity and intended use of the scaffold.

When Control Tech has reason to believe that a worker lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, Control Tech shall retrain each worker so that the requisite proficiency is regained.

- Retraining is required in at least the following situations:
- Where changes in scaffolding at the worksite present a hazard about which a worker has not been previously trained.
- Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which a worker has not been previously trained.
- Where inadequacies in an affected worker's work involving scaffolds indicate that the worker has not retained the requisite proficiency.

37.0 SHORT SERVICE EMPLOYEE PROGRAM (SSE)

37.1 PURPOSE

This Short Service Employee (SSE) Policy ensures that employees with less than six months experience in their current role or new to location are identified, supervised, trained, and managed to prevent injury to themselves or others, property damage, or environmental harm.

37.2 SCOPE

- Applies to all Control Tech employees in shop and field operations.
- Applies to all newly hired Control Tech employees (regardless of experience), temporary agency personnel or our independent contractors working on company or client locations/ facilities.

37.3 DEFINITIONS

Short Service Employee (SSE) – An employee or sub-contractor employee with less than six months experience in the same job or with his/her present employer, or in his/her present role.

Mentor – An experienced employee, who has been assigned to help and work with a new Short Service Employee by his/her supervisor.

Contractor – company or individual hired by Control Tech to perform specific jobs

Crew - Employees working at a single location and employed by the same contractor

37.4 RESPONSIBILITIES

- Control Tech will assign experienced employees to oversee the daily activities of those assigned to the SSE program.
- Control Tech shall monitor its employees, including SSE personnel, for HSE awareness and compliance.
- Managers and Supervisors shall ensure that this program is implemented and followed.
- Subcontractors must adhere to the requirements of the SSE program.
- Employees shall follow the requirements of this program.

37.5 GENERAL

Supervisors will ensure that all new, transferred and temporary employees have been through Control Tech Safety Orientation and have a complete knowledge of the expectations for their job function.

A SSE may not work alone.

A short service/new employee is mentored by an experienced/knowledgeable employee

Supervisors will identify all employees and temporary personnel with less than 6 months of service, or those employees they desire to return to a mentoring status for improvement in job and/or safety performance.

The short service/new employees shall be visibly identified through the use of a uniquely coloured hardhat or other method of identification.

- The method used to identify them should be communicated to the representative in charge of the site.
- The identifier and the colour may be stated by client or prime contractor.

Short service/new employees shall be monitored for compliance with health, safety, and environmental policies and procedures. Once the short service/new employee has demonstrated competency and compliance with HSE policies and procedures, the contractor may remove the hi-visibility identifier.

SSE workers are mentored by an experienced and knowledgeable employee. Control Tech has in place a mentoring process designed to provide guidance, assistance and development for SSE personnel.

Managers and the Safety Department will randomly audit for process compliance. This will involve interviewing employees in the Short Service Employee program (documentation is not required).

Control Tech client must be notified when a short service/new employee will be working at their site. Prior to the start of a job, Control Tech will notify the client project coordinator, prime contractor designate or on-site supervisor if SSE personnel are present on work crews. The project coordinator, contractor contact or on-site supervisor will determine approval status of the crew makeup.

37.5.1 NON-CONTRACT EMPLOYEES

SSE Policy Non-contract employees who are new to a location must be considered by Control Tech or their Designee for inclusion in the SSE program based on the specifics of their assignment. Factors to consider include, but are not limited to:

- job responsibilities/duties from previous assignments
- work processes/practices from previous assignments
- equipment/tools from previous assignments
- competency/training
- skill level
- familiarity with co-workers

Following are Control Tech's SSE

37.5.2 CREW REQUIREMENTS:

- Single person "crew" cannot be a SSE.
- Crews with 4 persons or less: 2-4 person crews can have only 1 SSE per crew.
- 5 or more person crews can have < 20% SSEs per crew.

37.5.3 SSE REQUIREMENTS

SSEs must:

- Be assigned an experienced mentor by the Contractor to assist the contractor employee during his/her "SSE period." It is the mentor's responsibility to closely supervise the assigned SSE and prevent him/her from performing tasks for which they are not properly trained.
- Be identifiable by location's agreed method.
- Follow the identification requirements while on location.

37.5.4 SSE MENTOR REQUIREMENTS

A mentoring system has been implemented to provide guidance to short service/new employees and assist with their development.

The mentor should remain on site with them at all times.

A mentor can only be assigned one crew that includes SSE and the mentor must remain onsite with them.

Mentors will converse daily with those persons assigned to them, preferably at the start of the day. This will be in addition to other tailgate or daily safety meetings held in the work area.

Mentors must:

- Set the proper safety example for any Short Service Employee assigned them
- Be familiar with the Short-Service Employee's job, the oversight responsibilities required, and the hazards associated with that job
- Have the current orientation training
- Be familiar with the site Policies, Procedures, and any specialized actions required in the work to be performed
- Exhibit the ability to recognize hazards and unsafe acts
- Be able and willing to challenge personnel in the workplace that do not comply with the site Procedures, Policies, or requirements, and enforce the Stop Work Authority
- Be an active participant in the Behavior-Based Safety Process

37.5.5 CONTRACTOR REQUIREMENTS

Contractors must manage their short service and new employees in accordance within the requirements of the short service/new employee program.

Contractors will manage their SSEs in alignment with this policy and procedures. This policy does not apply to visitors to a Control Tech location who are not performing work.

Attend a location-specific HSE orientation prior to beginning work on location. Applicable contractor and Control Tech HSE Policies shall be discussed during the orientation.

A Contractor new to location must fill out a SSE Form. This form must be completed by the contractor listing each individual SSE/New to Location. The form must be submitted and approved by Control Tech prior to starting work.

Contractors will verify their employee has the skills and knowledge to perform their task(s) prior to their arrival to the Control Tech location.

38.0 SILICA

38.1 PURPOSE

Silica, often referred to as quartz, is a very common mineral. It is found in many materials common on construction sites, including soil, sand, concrete, masonry, rock, granite, and landscaping materials. The purpose of this silica exposure control plan (ECP) is to document our methods to protecting workers from harmful exposure to airborne silica dust when working. The material in this document does not take precedence over applicable government legislation which all employees must follow.

38.2 RESPONSIBILITIES

Due to the significant risk posed by silica, it is critical that all personnel involved in operations that could potentially create silica dust take specific action to ensure that, as much as possible, a hazard is not created.

Company:

- Ensuring that the materials, tools, equipment, personal protective equipment and other resources required to fully implement and maintain this exposure control plan are available where and when they are required.
- Conducting a periodic review of the effectiveness of the ECP. This would include a review of the available dust-control technologies to ensure these are selected and used when practical.
- Ensuring supervisors and workers are educated and trained to an acceptable level of competency.
- Maintaining records of training, fit-test results, crew talks, and inspections (equipment, PPE, work methods/practices).
- Coordinating the work with the prime contractor and other employers to ensure a safe work environment.
- Ensure safe work practices and safe job procedures are developed and followed

Managers:

- Providing a job-specific ECP for each project, which outlines the work methods and practices that will be followed on each site. Considerations will include:
    - Availability and delivery of all required tools/equipment
    - Scope and nature of grinding work to be conducted
    - Control methods to be used
    - Level of respiratory protection required
    - Coordination plan
- Initiating sampling of worker exposure to concrete dust when there are non-standard work practices for which the control methods to be used have not been proven to be adequately protective.
- Ensuring that all required tools, equipment, and personal protective equipment are readily available and used as required by the ECP.

Job Supervisor:

- Obtaining a copy of the ECP from Control Tech, and making it available at the worksite
- Selecting, implementing, and documenting the appropriate site-specific control measures
- Providing adequate instruction to workers on the hazards of working with silica-containing materials (e.g., concrete) and on the precautions specified in the job-specific plan covering hazards at the location
- Ensuring that workers are using the proper respirators and have been fit-tested, and that the results are recorded
- Directing the work in a manner that ensures the risk to workers is minimized and adequately controlled

- Communicating with the prime contractor and other sub-contractors to ensure a safe work environment

Workers:

- Knowing the hazards of silica dust exposure
- Using the assigned protective equipment in an effective and safe manner
- Setting up the operation in accordance with the site-specific plan
- Following established work procedures as directed by the supervisor
- Reporting any unsafe conditions or acts to the supervisor
- Knowing how and when to report exposure incidents

38.3 DEFINITIONS

Exposed Worker: a worker who reasonably maybe expected to work in a "restricted area" at least 30 days in a 12-month period

Restricted Area: an area of the worksite where there is a reasonable chance that the concentration of Crystalline silica exceeds the OEL.

Silica: Silica is the second most common mineral on earth and makes up nearly all of what we call "sand" and "rock."

38.4 EDUCATION AND TRAINING

Workers are provided training on the hazards of silica and the safe work procedures. Control Tech must ensure that a worker who may be exposed to silica is

- informed of the health hazards associated with exposure to that substance,
- informed of measurements made of airborne concentrations of harmful substances at the work site
- trained in procedures developed by Control Tech to minimize the worker's exposure

38.5 USES OF SILICA

Silica's many uses include:

- molds and cores used to make metal castings
- refractory brick used in foundries, power plants and cement plants
- filter media for water filtration systems
- sports and recreational uses such as sand traps on golf courses and sand in playgrounds
- sandblasting abrasives
- building materials such as concrete, grout and plaster
- glass and fibreglass
- ceramics and fine china
- plastics and paints
- dental materials
- components for electronics, fibre-optics, lasers, and time keeping devices
- proppant for hydraulic fracturing in oilfield applications

38.6 SILICA EXPOSURE

When some silicon-containing materials are exposed to heat, they form crystalline silica. The crystalline silica is often more hazardous to workers than the original material. Silica exists in many forms—one of these, "crystalline" silica (including quartz), is the most abundant and poses the greatest concern for human health.

Some common materials that contain silica include:

- Rock and sand
- Topsoil and fill
- Concrete, cement, and mortar
- Masonry, brick, and tile
- Granite, sandstone, and slate
- Asphalt (containing rock and stone)
- Fibrous-cement board containing silica

Silica is a primary component of many common construction materials, and silica-containing dust can be generated during many construction activities, including:

- Demolition (structures containing concrete)
- Abrasive blasting (e.g., of concrete structures)
- Jackhammering, chipping, or drilling rock or concrete
- Bricklaying - cutting brick or tiles
- Sawing or grinding concrete
- Tuck point grinding
- Road construction
- Loading, hauling, and dumping gravel
- Sweeping concrete dust

It is the crystalline form of silica that is the main concern when considering health effects. Unprotected workers performing these activities, or working in the vicinity, can be exposed to harmful levels of airborne silica. Workers in other industries can also be exposed to silica, for example in the manufacture of toothpaste or pottery, or when loading coal (which can contain quartz) into the hold of a ship.

38.7 HEALTH HAZARDS

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

Silicosis

Caused when crystalline silica particles less than 10 microns in diameter are inhaled and deposited in the lungs. This is known as “respirable” silica. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. The scar tissue restricts the lungs’ ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

Factors that influence the development of silicosis include:

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

Silicosis can develop or progress even though exposure to crystalline silica has stopped.

Three types of silicosis can develop:

1. Chronic Silicosis: may develop due to ongoing (chronic) exposure to relatively low concentrations over a long period of time i.e. ten or more years.
2. Accelerated Silicosis: may develop five to ten years after the first exposure to high concentrations.

3. Acute Silicosis: may develop after exposure to very high concentrations of respirable silica. Symptoms appear within a few weeks to five years of the initial exposure. This disease is usually associated with a history of repeated exposures to tasks that produce small particles of airborne dust with a high silica content e.g. sandblasting, rock drilling or quartz milling.

Lung Cancer

Occupational exposure to respirable quartz and cristobalite can cause cancer. Quartz and cristobalite are classified as "Group 1, carcinogenic to humans". Workers exposed to high concentrations of respirable dust who have developed silicosis have an increased risk of developing lung cancer.

38.8 SILICA CODES OF PRACTICE

Control Tech has a silica code of practice governing the storage, handling, use and disposal of silica if there is potential for exposure. The code of practice addresses control measures to prevent worker exposure to silica and procedures to be followed in the event of an uncontrolled release of silica. The following also includes measures to be used to prevent the uncontrolled release of silica and the procedures to be followed if there is an uncontrolled release.

Hazard Assessment

Control Tech must ensure minimal release of crystalline silica to the air and keeping the worksite clear of unnecessary accumulations of silica dust.

Control Tech ensures an assessment is made in writing of the exposure or likelihood of exposure in a workplace of a worker to the inhalation of silica. Control Tech shall consider and take into account such matters as the methods and procedures used or to be used in the processing, use, handling, or storage of silica; the extent and potential extent of the exposure of a worker to the inhalation of silica and the measures and procedures necessary to control such exposure by means of engineering controls, work practices and hygiene practices and facilities.

Exposure Limits

Workers must not be exposed to an airborne concentration of silica that exceeds its occupational exposure limit. Control Tech will develop procedures to show how potential exposure to silica is assessed to ensure exposure does not exceed occupational exposure limits. Control Tech must ensure that no worker is exposed to a concentration of silica that exceeds the 8-hour TWA limit.

The potential for worker exposure to silica should be identified during the hazard assessment. Potential exposure to silica is assessed to ensure exposure does not exceed occupational exposure limits.

If a worker is or may be exposed to silica, Control Tech must ensure that:

- A walkthrough survey is conducted to assess the potential for overexposure taking into account all routes of exposure, including inhalation, ingestion, and skin contact
- Reassessment is conducted when there is a change in work conditions which may increase the exposure, such as a change in production rate, process, or equipment.

If the walkthrough survey reveals that a worker may be at risk of overexposure to silica, Control Tech must ensure that air sampling is conducted to assess the potential for overexposure.

Atmospheric testing results should be assessed before a worker is exposed.

Work Activities

Control Tech will have a qualified person review the planned work activities to identify those that may generate airborne silica.

- Identify workers at risk of exposure—For example, workers who finish concrete would be at greater risk of exposure than plumbers or electrical workers.
- Amount of exposure—some work activities generate more dust than others, and the amount of exposure should be estimated. Published resources are available that provide air sampling data and compare silica dust levels from various construction activities.
- Duration of exposure—Workers who grind concrete for a full shift would be at greater risk than workers jackhammering for an hour.

38.9 CONTROL OPTIONS FOR SILICA

Preventing exposure to crystalline silica is the best way to protect health. Options that should be considered include the following (listed in order of preference):

- Elimination/substitution (using less hazardous substitutes)
- Engineering controls (e.g., water, local exhaust ventilation, enclosure)
- Administrative controls (changing work practices to reduce exposure)
- Personal protective equipment (e.g., coveralls, respiratory protection)

Effective engineering controls such as HEPA vacuum attachments and wetting methods, which control silica dust at its source, are readily available. These controls have been proven to reduce airborne dust levels significantly when selected and operated in accordance with best practices. We know that engineering controls alone do not reduce airborne silica to safe levels; so in most cases other control measures, including respiratory protection, will be necessary.

We will reduce or eliminate worker exposure to silica dust by selecting a combination of the following controls listed in order of preference:

- Elimination and substitution
- Engineering
- Administrative
- Personal protective equipment

38.9.1 ELIMINATION AND SUBSTITUTION

Control Tech recognizes the importance of planning the work in order to minimize the amount of silica dust generated. During the project planning phase, managers and employees must plan for methods, where applicable, that reduce the need for cutting, grinding, or drilling of concrete surfaces (e.g., formwork planning).

Concrete:

- Whenever possible, Control Tech will schedule work when concrete is still wet, because much less dust is released at that time.

Silica substitutes in abrasive blasting:

- Aluminum Oxide (artificial corundum is harder and tends to cause more wear on blast nozzles and other equipment used in sandblasting. The product can be recycled and reused)
- Coal Slag (by-product of burning coal, can contain high levels of heavy metals such as arsenic, beryllium, chromium, nickel and lead)
- Copper Slag (by-product of copper smelting)
- Garnet (mineral is made up of a mixture of silicon dioxide, iron, and aluminum)
- Nickel Slag (by-product of nickel smelting, this product may contain arsenic, chromium and lead as well as nickel)

- Olivine (contains a high proportion of magnesium oxide and can also contain small amounts of chromium and nickel)
- Specular Hematite (a form of crystalline iron oxide)
- Staurolite (mineral sand with crystals made up of aluminum, iron, silicon and oxygen)
- Steel Grit (hardest metallic abrasive commercially available and can be recycled and reused)
- A number of other abrasives are available that are softer than silica sand (plastic media, corn cobs, nut shells, dry ice pellets, glass beads and sodium bicarbonate). These materials are usually used to remove contaminants from more delicate surfaces, so are not usually appropriate for the same applications as silica sand.

Where silica sand is chosen as an abrasive, the use of dust suppressants blended into the sand is recommended to help control dust.

Some of the alternatives to silica contain heavy metals for which there are also health concerns.

38.9.2 ENGINEERING CONTROL OF DUST

Engineering controls remove the dust from the air or provide a barrier between the worker and the dust. Examples of engineering controls used to prevent exposure to crystalline silica include:

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

Selecting an appropriate control measure depends on the specifics of the operation. In some cases, local exhaust ventilation (LEV) is more effective at controlling exposure (e.g., during grinding operations) than wetting methods. In a different application, wetting may be more effective (e.g., during cutting operations) than LEV. However, using LEV may reduce the amount of final cleaning required, as the silica dust is captured.

Local Exhaust Ventilation (LEV)

When LEV is used, Control Tech employees will follow the systems and safe work practices below:

- Vacuum attachment systems to capture and control the dust at its source whenever possible.
- Dust control systems (used regularly and well maintained).
- Grinding wheels operated at the manufacturers' recommended rpm (operating in excess of this can generate significantly higher airborne dust levels).
- Retrofit shrouds or exhaust cowlings for corner grinding - use manufacturer-specified rpm speeds and a well-maintained HEPA vacuum.
- Diamond stone grinders, which allow for the use of a more efficient suction casing on the grinder, whenever practicable.
- HEPA or good quality, multi-stage vacuum units approved for use with silica dust. [The vacuum units should be capable of creating target airflow of at least 70 cfm. This should achieve a face velocity at the shroud of about 1.3 m/s (260 fpm)—the higher the face velocity, the more dust captured at source.]
- Work planning, so that concrete grinding can be completed when wet (dust release can be significantly reduced).
- Good housekeeping work practices (for example, use vacuums with high-efficiency particulate air (HEPA) filters, or use wet sweeping).

- Train workers and supervisors on how to properly use and maintain the equipment.

Wet methods for Dust Control

When water spray systems are used Control Tech employees will follow these safe work practices:

- Pneumatic grinders will be used instead of electric-powered grinders if water is the method of control.
- Pressure and flow rate of water will be controlled in accordance with tool manufacturers' specifications (for cutting saws, a minimum of 0.5 litres of water per minute should be used).
- When sawing concrete or masonry, we will use only saws that provide water to the blade.
- Wet slurry will be cleaned from work surfaces when the work is completed, using a wet vacuum or wet sweeping.

Barriers and Enclosures

When barriers or enclosures are used Control Tech employees will follow these safe work practices:

- The site foreman will determine the type and design of barrier or enclosure (based on the work activity and the work area) and ensure it is constructed in accordance with the work plan. Barriers may be simple hazard-flagging ribbon or more restrictive hoarding.
- We will use commercially available negative air units when constructing a full enclosure.

38.9.3 ADMINISTRATIVE CONTROLS

The following work practices will be implemented at the workplace to reduce potential exposure to silica dust. Workers must be trained, use the practices properly, and have their work activities monitored by management.

Instructions must be followed ensuring engineering controls and other equipment used to reduce exposure are used and maintained properly.

Educating workers to understand the hazards associated with crystalline silica. Workers must participate in training and monitoring programs.

Good hygiene practices — workers must not eat, drink or use tobacco products in areas contaminated by crystalline silica. The hands and face should be washed before eating, drinking or smoking.

Exposure control plans and the site risk assessment/work plan will be submitted to the general contractor prior to the start of work.

Control Tech recognizes that awareness and planning are key factors in the prevention of silicosis. As part of our project planning, Control Tech will assess when silica dust may be generated and plan ahead to eliminate or control the dust at the source.

Warning signs will be posted to warn workers about the hazards of silica and to specify any protective equipment required (for example, respirators).

Work schedules will be posted at the boundaries of work areas contaminated with silica dust.

Work that generates silica dust may be conducted after hours, when access to other unprotected workers cannot be restricted.

Control Tech supervisors will develop a site-specific exposure control plan to cover project-specific issues (e.g., scope of work, project location and site-specific hazards) and to be kept available at the worksite.

38.9.4 PPE

Personal protective equipment (PPE) is required when it is not practicable or feasible to use substitutes, engineering controls, or change work practices to control exposure. The use of personal protective equipment as the primary means to control exposure is permitted only when:

- Substitution, or engineering or administrative controls are not practicable
- Additional protection is required because engineering or administrative controls are insufficient to reduce exposure below the applicable exposure limits
- The exposure results from temporary or emergency conditions only.

Respiratory protective equipment is provided, where necessary, to protect employees from silica. If a worker is or might be exposed to a concentration of silica that exceeds its ceiling limit, Control Tech must provide an appropriate respirator and ensure that the worker uses it.

In addition to the general requirements related to respiratory protective equipment, where a worker is carrying out abrasive blasting operations, Control Tech must ensure that the worker is provided with a hood supplied with air that is at a positive pressure not exceeding 140 kPa.

Workers must be trained in how to use PPE and Control Tech managers need to monitor use and ensure that the protective equipment is maintained properly. Issues such as heat stress, restricted vision, and allergic reactions to the equipment material need to be evaluated when personal protective equipment is selected.

38.9.5 METHODS USED TO PREVENT WORKER CONTAMINATION

Control Tech must provide workers, in a restricted area, with protective clothing that protects other clothing worn by the worker from silica contamination to ensure that workers' street clothing is not contaminated by silica and must ensure that a worker does not leave a restricted area until the worker has been decontaminated.

Control Tech will provide workers with respiratory equipment if Control Tech cannot reduce potential exposure below the occupational exposure limit because an emergency exists or the measures and procedures necessary to control the exposure of a worker to the airborne silica do not exist or are not available, are not reasonable or practical for the length of time or frequency of exposure or the nature of the process, operation, or work, or are not effective because of a temporary breakdown of equipment.

Respiratory protection

- All workers who wear respirators will do so in adherence with our respirator program.
- Respiratory protection will be selected based upon the site-specific risk assessment.
- Only approved respirators will be used.
- Workers who wear respirators will be clean-shaven. Filtering facepiece respirators give little or no protection to workers with beards, and even a minor growth of stubble can severely reduce the effectiveness of respiratory protection.
- All workers who wear respirators will be fit-tested.
- Workers will be properly trained on the selection, use, and care of respirators. Control Tech shall provide training and instruction to a worker in the proper care and use of respiratory equipment provided by Control Tech.

Protective Clothing

Control Tech will provide workers in a restricted area with protective clothing that protects other clothing worn by the worker from silica contamination, ensure that workers' street clothing is not contaminated by silica, and ensure that a worker does not leave a restricted area until the worker has been decontaminated.

38.10 HEALTH ASSESSMENTS FOR EXPOSED WORKERS

Since there is no cure for silicosis, early detection is very important. Exposure must be minimized or eliminated if health effects are discovered. The silica-exposed worker should undergo a health assessment to provide a baseline health evaluation so that early changes to the lungs can be more easily detected. This assessment must be completed in compliance with OHS requirements.

Workers exposed to silica above the occupational exposure limit are provided health assessments. A health assessment must comply with the requirements outlined in Part 4, Section 40 (2) of the OHS Code.

The person with custody of the health assessment record must ensure that no person, other than the worker or health professional who conducts the health assessment, has access to the exposed worker's health assessment unless:

- the record is in a form that does not identify the worker
- the worker gives written permission for access by another person

Control Tech must ensure that a worker undergoes a health assessment:

- not more than 30 calendar days after the worker becomes an exposed worker, and
- every two years after the first health assessment

Exposed workers may refuse to undergo part or all of a health assessment by giving the employer a written statement refusing it.

Control Tech must pay the cost of the health assessment. Control Tech must ensure that, if it is reasonably practicable, a health assessment is performed during normal work hours.

A health assessment for silica-exposed workers consists of:

- health history information
- a chest x-ray
- a radiologist's report
- a lung function test
- a physician's written interpretation and explanation of the assessment results

Information in the health assessment is confidential and persons having custody of the information must ensure that it is kept confidential. Control Tech designated representative must ensure that no person, other than the worker or health professional who conducts the health assessment, has access to the exposed worker's health assessment unless the record is in a form that does not identify the worker or the worker gives written permission for access by another person.

39.0 SUBCONTRACTOR MANAGEMENT PLAN (SMP)

It is Control Tech's policy to provide its customers with quality products and services. This company-wide commitment applies to all activities, products or services delivered to the Control Tech's customers.

Mission-success requirements and philosophies will be applied to all activities, including the activities of those suppliers and subcontractors to ensure delivery of products and services to our customers meet or exceed the required performance levels as agreed upon in the Prime Contract.

Control Tech requires a consistent method of pre-qualifying contractors and subcontractors with the goal of ensuring Health, Safety and Environmental (HSE) issues are addressed. The Subcontract Management Plan (SMP) describes the process used by the Control Tech to select qualified subcontractors and manage them efficiently. The SMP combines the concerns of requirements management, project planning, project tracking, and project oversight for basic management control, along with necessary coordination of quality assurance (QA) and configuration management (CM), and applies this control to the subcontractor as appropriate.

In the event that an owner/operator subcontractor does not have a health and safety program, Control Tech is responsible for making sure the subcontractor is aware of applicable Control Tech health and safety policies, procedures and regulations. Control Tech must ensure that the owner/operator was supplied with and follows Control Tech safety program as an employee would.

The Control Tech SMP initiates and controls the processes for managing and integrating project activities, and provides methods and guidance for the selection and management of subcontractors using proven processes and methods that assure successful program execution. The SMP shall be updated annually or as required to reflect changes in subcontractor management functions and/or processes.

Contractors or subcontractors must implement the required HSE program and ensure compliance with applicable legislation

The material in this document does not take precedence over applicable government legislation which all workers and/or subcontractors must follow.

39.1 PURPOSE

The purpose of this program is to ensure that Control Tech continues to improve subcontractor health, safety and environmental performance and to establish a standard for pre-qualification, evaluation / selection and development of our subcontractors. The material in this document does not take precedence over applicable government legislation which all employees must follow.

39.2 SCOPE

This program applies to all subcontractors and those who manage subcontractors on all Control Tech locations. When work is performed on a site controlled by a prime contractor, the prime contractor's program shall take precedence. Any subcontractor that has a "Non-Approved" safety status will not be used on any Control Tech site.

39.3 GENERAL REQUIREMENTS

This SMP provides consistent processes for managing subcontractors and represents Program Management's plan for the ERA execution with the following expectations:

- Consistent application of management oversight for all subcontractors
- Control of subcontractors and the development-to-production process to minimize program impacts due to cost, schedule, or technical performance issues

- Defining and establishing subcontract management teams that clearly understand program expectations for subcontract execution
- Define and establish the appropriate business relationships with our subcontractors to assure program success.

All Control Tech subcontractors are to be managed in accordance with this program.

The use of subcontractors must be pre-approved by Control Tech. Approval requirements include:

- A formal safety review of the subcontractor must be performed by Control Tech safety department.
- The scope of the review was commensurate with the hazards and risk exposure.
- Subcontractor has been/will be oriented to the safety policies, expectations and requirements of Control Tech.
- The subcontractor agrees to abide by our Drug and Alcohol policy and onsite safety rules throughout the duration of the work.
- The subcontractor will designate an onsite safety representative.
- Subcontractor must provide SDS's for all chemicals brought onsite.

Any subcontractor that has a "Non-Approved" safety status will not be used by Control Tech.

Control Tech is responsible for communicating the hiring client's Drug and Alcohol policy to subcontractors. Subcontractors must adhere to the requirements of the Drug and Alcohol policy at all times while at the work site.

Control Tech must report all incidents involving subcontractors to the hiring client and participate in the subcontractor's incident investigations. Control Tech must ensure that subcontractors are aware of incident reporting requirements. Subcontractors must report all incidents to Control Tech. If a subcontractor is involved in an incident, Control Tech is responsible for reporting the incident to the hiring client. Control Tech must ensure the incident is investigated and must participate in the investigation. Control Tech shall follow up to ensure all identified corrective actions are completed.

39.4 CONTRACTOR SAFETY MANAGEMENT PROCESS

39.4.1 ONSITE MANAGEMENT OF SUBCONTRACTORS

The approach to managing the subcontractors is based on the following guiding principles:

- A Project Office will be established to effectively support the needs of the subcontractors
- Effective channels of communications will be clearly defined and established
- A Statement of Work will be developed jointly by the team with each subcontractor taking responsibility for the deliverables and services outlined in its areas of responsibility
- Each subcontractor will have its responsibilities and authorities clearly defined in the Statement of Work
- Each subcontractor will have its deliverables identified and required content clearly specified in the Statement of Work
- Each subcontractor will have the services it is responsible for providing clearly identified and described in the Statement of Work
- All constraints imposed on the subcontractor will be clearly identified in the Statement of
- Work, including schedule and budget constraints
- Each subcontractor will have requirements for quality clearly identified to it in the Statement of Work, including the requirement to allow independent quality inspections of materials and processes
- All products and services provided by the subcontractor will be subject to the acceptance of Control Tech

- Each subcontract will contain appropriate terms and conditions
- Adequate facilities will be provided to meet the needs of the subcontractors
- Prime contractor will support subcontractors in processing invoices and payments, subject to the invoices being delivered to Control Tech in an acceptable format for consolidation and remittance to Customer.

39.4.2 PROJECT ROLES AND RESPONSIBILITIES SCHEMATIC & DEFINITIONS

FUNCTIONAL ELEMENT	PRIME CONTRACTOR	Control Tech	SUB A	SUB B	SUB C	SUB D	SUB E
DAY-TO-DAY PROJECT MANAGEMENT							
PROJECT SITE OFFICE (SUPPORT)							
BUSINESS PROCESS REENGINEERING							
MANAGEMENT OF CHANGE							
ORGANIZATIONAL DESIGN/HUMAN RESOURCES							
COMMUNICATIONS							
INFORMATION TECHNOLOGY							
TRAINING							
QUALITY ASSURANCE							
INDEPENDENT VERIFICATION AND VALIDATION							

Pre-Qualification of Subcontractors

Subcontractors will be pre-qualified by reviewing their safety programs, safety training documents and safety statistics.

Control Tech must confirm subcontractors have valid Workers Compensation coverage. Control Tech must ensure it obtains proof of workers compensation coverage from their subcontractors.

Subcontractors who are not required to have workers compensation coverage must obtain approval from their Owner Client(s) before they are allowed to enter the work site.

Workers Compensation Confirmation and History

Control Tech must confirm subcontractors have valid Workers Compensation coverage. Control Tech must ensure they obtain proof of Workers Compensation coverage from their subcontractors. Subcontractors who are not required to have Workers Compensation coverage must obtain approval from their hiring client(s) before they are allowed to enter the work site.

HSE statistics (workers compensation rate sheets) are reviewed when selecting subcontractors. Past performance is a key indicator of future performance. HSE statistics should be obtained and analyzed to ensure that only safe subcontractors are hired. Control Tech should obtain a copy of the subcontractor's workers compensation rate sheet and compare their performance to others in their industry. Those who outperform the industry should be selected whenever practicable.

Subcontractor Program and Training Review

HSE programs and/or training documentation are reviewed when selecting subcontractors. Written Health, Safety and Environmental programs and training documentation applicable to the type of work the subcontractor will perform should be obtained and reviewed to assist with the hiring of safe subcontractors.

Procedures to be followed if a subcontractor does not have a Health and Safety Program

Control Tech is responsible for making sure the subcontractor is aware of applicable Health and Safety policies, procedures, and regulations. The procedure Control Tech follows if a subcontractor does not have a Health and Safety Manual includes:

1. Informing WCB and adding them to Control Tech WCB account.
2. The hiring package will be completed by the subcontractor and copies of all pertinent training documentation (safety certificates, position specific certification and documentation e.g.: proper licensing for units being driven, first aid, WHMIS, driver's abstracts) will be handed into office with the standard orientation documents.
3. Subcontractors will be given the Health and Safety policies, procedures, and regulations that must be followed.
4. Prior to the commencement of work on Control Tech or client property or property/projects managed by Control Tech, all contractors and their employees shall receive an initial site safety and health orientation.
5. Each site shall document the names of the contractor employees receiving such safety and health orientation and submit the training records to the safety department for Control Tech.

Subcontractor Orientation

A site orientation is provided to subcontractors. Subcontractors must be provided a site orientation that addresses health, safety, security, and/or environmental concerns.

Control Tech reserves the right to change a subcontractor's status to "Non-Approved" if the subcontractor shows insufficient progress towards accepted mitigation plan or other agreed upon criteria.

Subcontractor Involvement

Contractors are required to follow or implement the work practices and systems described below while performing work at Control Tech worksites:

- Attend an safety orientation, included in any pre-job meeting or kick-off meeting provided by Control Tech prior to any work beginning
- Monitor employees for substance abuse and report nonconformities to Control Tech
- Ensure personnel have the required training and competency for their work
- Subcontractors are included in pre-job meetings and/or hazard assessments. Pre-job meetings can include information taken from a hazard assessment and any other safety or operational concerns.
- Perform a pre-job safety inspection that includes equipment
- Participate in the BBS hazard reporting system
- Report all injuries, spills, property damage incidents and near misses
- Comply with onsite and hiring client's safety rules
- Implement Control Tech safety practices and processes as applicable
- Clean up and restore the worksite after the job is over
- Ensure compliance with regulations at all times
- Post-job performance reviews are conducted for subcontractors. Post job performance reviews should be conducted for subcontractors. A combination of factors may be considered including, but not limited to, housekeeping, cost, and active participation in safety meetings and quality of work.
- Post-job safety performance reviews shall be conducted for subcontractors.

39.4.3 INCIDENT MANAGEMENT

Control Tech is accountable for reporting and investigating subcontractor incidents. Control Tech must ensure that subcontractors are aware of incident reporting requirements. Subcontractors must report all incidents to Control Tech. If a subcontractor is involved in an incident, Control Tech is responsible for reporting the incident to the Owner Client. Control Tech must ensure the incident is investigated.

39.4.4 QUALITY ASSURANCE

Control Tech provides the project discipline functions through the Quality Assurance. These functions include:

- providing quality assurance and quality control services
- providing configuration management services
- providing risk management services
- coordinating the establishment of project standards and procedure

40.0 THERMAL EXPOSURE – EXTREME TEMPERATURES

40.1 PURPOSE

The purpose of this program is to provide direction to managers, supervisors, and employees about their responsibilities as related to safe work procedures pertaining to thermal exposure. The material in this document does not take precedence over applicable government legislation which all employees must follow.

40.2 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the thermal exposure program. These procedures are kept in the designated safety manager's office.

Site Manager

- Responsible for the implementation and maintenance of the program for their site and ensuring all assets are made available for compliance with the plan.

Employees

- All shall be familiar with this program.
- Follow all requirements, wear designated PPE, report unsafe conditions and follow all posted requirements.

40.3 THERMAL STRESS

40.3.1 CONTROL MEASURES TO PROTECT EMPLOYEES FROM HEAT STRESS

If heat stress is not treated in the early stages a much more serious condition, such as heat exhaustion and/or heat stroke can develop. In heat exhaustion, your body loses too much water and salt as sweat and lead to Heat Stroke. Heat stroke is a life-threatening condition in which the body's core temperature rises above 41°C. Without immediate first aid, heat stroke can result in loss of consciousness, permanent brain damage, and death.

If a worker is or may be exposed to heat stress Control Tech must implement engineering controls to reduce the exposure of workers. If engineering controls are not practicable, Control Tech must reduce the exposure of workers to levels below those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard by providing administrative controls, including a work-rest cycle or personal protective equipment, if the equipment provides protection equally effective as administrative controls.

Workers showing symptoms of heat stress must be removed from the heat and provided first aid. If a worker shows signs or reports symptoms of heat stress or strain, the worker must be removed from the hot environment and treated by an appropriate first aid attendant, if available, or by a physician.

Additional control measures include:

New employees should acclimatize before assuming a full workload. It is advisable to assign about half of the normal workload to a new employee on the first day of work and gradually increased on subsequent days.

Potable water is provided to workers to prevent heat stress. If a worker is or may be exposed to high temperatures, Control Tech must provide and maintain an adequate supply of cool potable water close to

the work area for the use of a heat exposed worker. On average, about one litre of water each hour may be required to replace the fluid loss.

Supervisors will provide frequent reminders to employees to drink frequently.

Every morning there will be a short tailgate meeting to remind workers about the importance of frequent consumption of water throughout the shift during hot weather.

When drinking water levels within a container drop below 50%, the water shall be replenished immediately or water levels should not fall below the point that will allow for adequate water during the time necessary to effect replenishment.

Disposable/single use drinking cups will be provided to employees or provisions will be made to issue employees their own cups each day.

Supervisors will set-up an adequate number of umbrellas, canopies or other portable devices at the start of the shift and will relocate them to be closer to the crew, as needed.

Working hours will be modified to work during the cooler hours of the day, when possible.

When a modified or shorter work-shift is not possible, more water and rest breaks will be provided.

Supervisors will continuously check all employees and stay alert to the presence of heat related symptoms.

Supervisors will carry cell phones or other means of communication, to ensure that emergency services can be called and check that these are functional at the worksite prior to each shift.

Every morning, if the crews are moving to different locations, workers will be reminded about the address and directions to the worksite in case it is necessary to inform medical responders and emergency procedures.

Wear loose clothing that permits sweat evaporation but stops radiant heat. Use cooled protective clothing for extreme conditions.

40.3.2 CONTROL MEASURES TO PROTECT EMPLOYEES FROM COLD STRESS

One of the major hazards you face when working in the cold is losing body heat. Hypothermia is when your body becomes so cold that it can no longer produce more heat than it loses. With hypothermia, your vital organs and body systems begin to lose their ability to function. Hypothermia can happen so slowly that you don't realize you're in danger until it is too late. That's why it's important to be able to recognize the early signs. If untreated, hypothermia can lead to death. It is important to treat hypothermia in its early stages. If no action is taken, the condition may worsen and become moderate or severe hypothermia. Always stay on the lookout for early signs of hypothermia in both your co-workers and yourself. Review the following three stages to help you recognize the danger signs.

If a worker is or may be exposed to low temperatures Control Tech must implement effective engineering controls to reduce the exposure hazard.

If the above action is not practicable, Control Tech must reduce the exposure hazard by providing effective administrative controls or personal protective equipment, if the equipment provides protection equally effective as administrative controls. Examples include:

Engineering Controls – heated supplied air equipment, etc.
Administrative Controls - a work-rest cycle, warm up sheds, etc.
Personal Protective Equipment – arctic cold weather clothing, etc.

For continuous work in temperatures below the freezing point, heated warming shelters such as tents, cabins or rest rooms should be available. The work should be paced to avoid excessive sweating. If such work is

necessary, proper rest periods in a warm area should be allowed and employees should change into dry clothes.

New employees should be given enough time to get acclimatized to cold and protective clothing before assuming a full work load.

For work below the freezing point, metal handles and bars should be covered by thermal insulating material. Also, machines and tools should be designed so that they can be operated without having to remove mittens or gloves.

Clothing should be selected to suit the temperature, weather conditions (e.g., wind speed, rain), the level and duration of activity and job design. Clothing should be worn in multiple layers which provide better protection than a single thick garment. Almost 50 percent of body heat is lost through the head. A wool knit cap or a liner under a hard hat can reduce excessive heat loss.

Clothing must be dry. Moisture should be kept off clothes by removing snow prior to entering heated shelters.

If fine manual dexterity is not required, gloves should be used below 4°C for light work and below -7°C for moderate work. For work below -17°C, mittens should be used. Cotton is not recommended. It tends to get damp or wet quickly, and loses its insulating properties. Wool and synthetic fibres, on the other hand, do retain heat when wet.

Felt-lined, rubber bottomed, leather-topped boots with removable felt insoles are best suited for heavy work in cold since leather is porous, allowing the boots to "breathe" and let perspiration evaporate.

Liner socks made from polypropylene will help keep feet dry and warmer by wicking sweat away from the skin. Always wear the right thickness of socks for your boots.

In extremely cold conditions, where face protection is used, eye protection must be separated from the nose and mouth to prevent exhaled moisture from fogging and frosting eye shields or glasses.

Workers showing symptoms of cold stress must be removed from the cold and provided first aid. If a worker exposed to cold shows signs or reports symptoms of cold stress or injury, the worker must be removed from further exposure and treated by an appropriate first aid attendant, if available, or a physician.

40.4 ADVERSE WEATHER CONDITIONS

40.4.1 CONTROL MEASURES TO PROTECT DRIVERS EXPOSED TO ADVERSE CONDITIONS

- Check weather conditions, forecasts and road conditions before leaving.

Vehicles must not be dispatched when adverse conditions are known to exist on the route.

Vehicles shall not operate during adverse weather conditions when:

- the visibility due to snow or fog is less than 150 metres
- the roadway is covered with snow, sleet, or ice which impedes the driver’s or other motorist’s
- ability to drive in a safe manner

If you encounter unexpected conditions as listed above while already enroute:

- Stop at the next safe location (or as directed by an authorized Transportation staff member or a peace officer) and wait for the adverse conditions to subside.
- DON’T stop on the side of a highway where part of your load extends into a driving lane or shoulder.

Driving

- Radio should be on to listen to forecasts and warnings to keep updated on the conditions as you travel because weather conditions change frequently.
- If unexpected adverse conditions are encountered enroute drive with extreme caution until the next safe location (pullout) stop and wait for the adverse conditions to abate.
- You must not stop on the side of a highway such that part of the load extends into a driving lane or shoulder. (Unless directed to do so by an authorized transportation staff member or a peace officer)
- Office/dispatch must be informed immediately to let them know where you are and conditions that apply.

Stranded Enroute

- Contact office/dispatch immediately with location
- Run vehicle if it is safe to do so to stay as warm as possible.
- Always leave the window down a bit and ensure the exhaust can be vented clearly away from vehicle. Get out and clean away snow from around exhaust pipe (as/if situation requires).
- If you can smell the exhaust strongly shut vehicle off immediately.
- If you find yourself getting tired, get out of vehicle and breathe some fresh air. (There may be an exhaust problem you are unaware of)
- If you can't keep vehicle running warm it as much as possible by shutting windows and lighting a candle from emergency kit. Wrap yourself in additional clothing, blankets. Do not overdress as sweating can cause more problems.

40.5 TRAINING

All employees shall be trained on recognition of heat and cold stress symptoms and emergency procedures for the treatment of heat and cold stress. Training shall be on an annual basis and documented.

DANGER SIGNS AND SYMPTOMS HEAT STRESS / HEAT STROKE	
Heat Exhaustion	**Heat Stroke**
• Shallow breathing • Increased breathing rate • Weak, rapid pulse • Cool, pale, clammy skin • Sweating • Weakness, fatigue, dizziness • Headache and nausea • Fainting • Muscle cramps • • **NOTE:** Sweating is an important sign, because it is often the only way to tell apart heat exhaustion from a life-threatening condition called heat stroke.	• Hot, dry, flushed skin • Seizures • Absence of sweating • Increased breathing rate • Agitation, confusion • Irregular pulse • Decreased level of consciousness • Shock • Headache • Cardiac arrest • Nausea and vomiting
TREATMENT	
Heat Stress	**Heat Stroke**
• Seek medical aid immediately • Move the worker to a cooler environment • Worker should lay down • Remove or loosen tight-fitting clothing • Sponge worker with cool water and fan them to cool body temperature. (Take care not to cool the worker too much. If the worker begins to shiver, stop cooling)	• Move the worker to the coolest place available. • Notify the first aid attendant, call 911, and/or arrange for immediate transportation to medical aid. • Maintain airway, breathing, and circulation as required, and monitor patient until help arrives. • Remove all outer clothing, and apply cold water to the worker by either dousing or applying wet, cool sheets.

	• Spraying or sponging the entire body with cold water is also effective. Fanning will also help. • Continue to cool the worker during transport.
PREVENTION	
Heat Stress	**Heat Stroke**
• Acclimatize your body by gradually exposing yourself to the heat and work. • Drink plenty of water (one glass every 20 minutes). • Wear clean, light coloured, loose-fitting clothing made of breathable fabric. • Take rest breaks in a cool or well-ventilated area. • Take more breaks during the hottest part of the day or when doing hard physical work. • Allow your body to cool down before beginning again.	• Acclimatize your body (gradually expose yourself to heat and work). • Drink plenty of water (one glass every 20 minutes). • Wear clean, light coloured, loose-fitting clothing made of breathable fabric. • Take rest breaks in a cool or well-ventilated area. • Take more breaks during the hottest part of the day or when doing hard physical work. Allow your body to cool down before beginning again. • Schedule work to minimize heat exposure. • Do the hardest physical work during the coolest part of the day.

DANGER SIGNS AND SYMPTOMS
HYPOTHERMIA

MILD HYPOTHERMIA	MODERATE HYPOTHERMIA	SEVERE HYPOTHERMIA
• Spells of shivering • Sleepiness, unsteadiness, poor judgment, muddled thinking, and abnormal behaviour • Breathing and pulse is normal	• Intense or violent shivering, or shivering has stopped altogether • Inability to think and pay attention • Slow, shallow breathing, slurred speech, • Poor body co-ordination • Pulse is slow or weak	• Person has stopped shivering • Unconsciousness • Little or no breathing • Weak, irregular, or non-existent pulse • Pupils are dilated and victim may appear dead but is still alive
TREATMENT		
MILD HYPOTHERMIA TREATMENT	**MODERATE HYPOTHERMIA TREATMENT**	**SEVERE HYPOTHERMIA TREATMENT**
• Insulate from ground – pine branches, leaves, moss, anything to provide insulation will work. • Change wet clothing for windproof, waterproof gear • Add heat - If using hot water bottles or chemical hot packs, wrap them in cloth; don't apply them directly to the skin. – if safe, start a fire • Increase exercise, if possible • Get into a pre-warmed sleeping bag or blankets • Drink hot drinks, followed by candy or other high-sugar foods • Apply heat to neck, armpits and groin • Medical attention should be sought out, even if a full field recovery is achieved.	• Insulate from ground – pine branches, leaves, moss, anything to provide insulation will work. • Change wet clothing for windproof, waterproof gear • Add heat - If using hot water bottles or chemical hot packs, wrap them in cloth; don't apply them directly to the skin. – if safe, start a fire • You can apply warm bottles of water, or warm rocks to the armpits and groin area (comfortably warm when touched by a hand flat on the stone and held in place). • Fully conscious victims can sip lukewarm sweetened, non-alcoholic fluids. If their condition is clearly improving then more fluids and warmth can be administered. •	• Call 911 for immediate medical treatment • In severe hypothermia, the best hypothermia treatment is best for three people to get under a pile of blankets or in a sleeping bag. Skin on skin contact of the torso works best with a person on each side of the victim. You should ignore their pleas to be left alone or allowed to go to sleep, but be gentle with them. • You should not administer fluids or make any other attempts to increase body temperature. • Maintaining temperature and preventing further loss is the most important thing. • If a person becomes unconscious from hypothermia monitor their breathing and pulse carefully. • Summon an Emergency Response Team. • If you can detect a faint pulse do not do CPR to support their heart. Only start rescue breathing, chest compressions or full CPR if you cannot detect any breathing, any pulse or both. Check frequently to see if they start breathing

		on their own, even if it is shallow, the same for a pulse. • Administering CPR to someone, even someone with a slight pulse can cause his or her heart to stop.

PREVENTION

- Wear warm head covering - Most body heat is lost through the head.
- Wear layered clothing - Layers allow warm air to stay trapped but do not trap perspiration next to the skin.
- **1st** layer of clothing should allow the skin to breathe by allowing sweat to escape. Underwear, socks, and glove liners made of polypropylene.
- **2nd** layer of insulating clothing should be one that absorbs perspiration but does not allow heat to escape.
- **3rd** layer of clothing should also trap body heat as well as keep water or dampness out.
- Drink plenty of non-alcoholic fluids - Doing this will help prevent dehydration and exhaustion, which can lead to hypothermia. Heated drinks can be helpful, but limit your intake of coffee and tea.
- Pace yourself during vigorous activity.
- Take regular breaks to get away from the cold environment.
- When possible, heat the working environment or set up heated rest areas. (heated cabs or shelters)

41.0 TRAFFIC CONTROL

41.1 PURPOSE

The purpose of the program is to provide guidelines and establish minimum requirements for traffic control in operations for all locations. The material in this document does not take precedence over applicable government legislation which all employees must follow.

41.2 SCOPE

When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises or when an operator's program doesn't exist or is less stringent.

41.3 RESPONSIBILITIES

Managers

- Managers and supervisors are responsible for ensuring that all employees, and/or contractors have been properly trained in the requirements of the job and how to perform the jobs safely.
- Ensure compliance in the procedures, equipment and PPE associated with traffic control.

Traffic Control Supervisors

- Required traffic control devices are in place
- All TCPs are wearing the required personal protective clothing and equipment
- TCPs are positioned in a safe location clear of potential environmental hazards such as a slide or avalanche
- TCPs perform traffic control duties competently and safely
- Responsibility for co-ordination of changes in traffic flow when two or more TCPs are required to work as a team in a traffic control zone has been assigned to an experienced TCP.

Traffic Control Personnel

- Receive and communicate specific instructions clearly, firmly, and courteously.
- Staying Alert
- Be professional at all times on the job
- Provide for safe passage of equipment and workers, and to allow work to proceed as smoothly as possible
- Move and maneuver quickly.
- Control signaling devices, such as paddles and radios.
- Understand and apply safe traffic-control practices.

41.4 TRAINING

Workers involved in traffic control are provided training. Mandatory training has been legislated for any worker involved in traffic control. Every employer shall develop a written traffic protection plan to protect workers if any of them may be exposed to a hazard from vehicular traffic.

Control Tech must ensure that workers required to perform traffic control duties are adequately trained in their responsibilities and the safe work practices.

- Control Tech must ensure that before a worker is designated as a flag person, the worker is trained in the safe work procedures for the safe control of traffic operations.

41.5 TRAFFIC CONTROL PERSONS (FLAGGERS) PERFORM SOME OR ALL OF THE FOLLOWING DUTIES:

- Set up and provide traffic control plan specifications
- Control traffic from highly visible and safe positions
- Adjust work zones as work progresses
- Check for variations in the worksite and adapt the worksite setup as required.
- Respond to emergency situations and hazards
- Direct drivers, pedestrians, and workers to a safe route around the road construction sites
- Train other workers on site about traffic and equipment safety
- Traffic control persons (flaggers) have significant responsibility and take precedence over streetlights, stop signs and any other regulatory rules on our rural and urban roads.
- some of the activities they perform:
- Attend and participate in regular onsite safety meetings with the Traffic Control Supervisor and other TCPs.
- Check with the supervisor before the shift starts to find out about the activities that day
- Check hand signals used by crew to indicate work activities
- Check location of first aid stations and identify workers with first aid certification
- Identify and locate equipment working on the site
- Assist in setup of traffic control zones in accordance with regulations and standards
- Locate safe escape routes
- Remove traffic control devices at the end of the day or when the job is finished

41.6 TRAFFIC PROTECTION PLAN FOR CONSTRUCTION ZONES

Control Tech shall develop, in writing, and implement a traffic protection plan for its workers at a worksite if any of them may be exposed to a hazard from vehicular traffic that may endanger the safety of any worker. It shall include the following control measures:

- Effective means of traffic control shall be provided whenever the unregulated movement of vehicular traffic constitutes a hazard to workers.

Control Tech shall ensure the use of signs, barricades, and other control measures to protect workers from traffic hazards. If a worker at a project on a highway may be endangered by vehicular traffic unrelated to the project, the project shall make use of as many of the following measures as is necessary to adequately protect the worker:

  - speed reduction
  - warning signs
  - barriers
  - lane control devices
  - flashing lights
  - detours
  - conspicuously identified pilot vehicles/pace vehicles
  - longitudinal buffer areas
  - automatic or remote controlled traffic control systems
  - changeable message boards
  - designated persons directing traffic, or
  - methods described in the Manual of Uniform Traffic Control Devices for Canada (1998) and its updates, published up to and including June 30, 2009 by the Transportation Association of Canada

A means of communication is provided when there is more than one traffic control person. When there are multiple traffic control persons that are not working within sight of each other, an effective means of communication should be provided and used (preferably radios).

Traffic control personnel must wear high visibility work apparel.

British Columbia specific requirements:

Traffic control signs and devices must be positioned and used as specified in the Traffic Control Manual (issued by the Ministry of Transportation), and signs and devices must be located so as to allow traffic to move by or through the work area in a controlled manner and, if necessary, to come to a controlled stop with due regard for the prevailing weather and road conditions. A sign advising of a traffic control person ahead must be placed in advance of each traffic control person's station, and this sign must be removed promptly when a traffic control person is no longer on duty at that station.

Traffic control person must be situated in a safe position at least 25 m away from the work area. A traffic control person must:

- stand in a safe position, preferably on the driver's side of the lane under the TCP's control, be clearly visible, and have an unobstructed view of approaching traffic, and
- be positioned at least 25 m (80 ft) away from the work area unless circumstances or space requirements, such as working at or near an intersection, dictate otherwise

Traffic control personnel must wear high visibility work apparel that meets: Type 2 criteria of WCB Standard Personal Protective Equipment Standard 2-1997, High Visibility Garment or the Class 2 or 3 garment criteria of CSA Standard Z96-02, High-Visibility Safety Apparel, with a fluorescent background colour, wrist and lower leg bands fitted with a minimum 5 cm (2 in) wide fluorescent retroreflective strip about their entire circumference, except that wrist and lower leg bands are not required for a traffic control person performing this function on an emergency or a temporary basis and not as part of their normal duties, and safety headgear of a high visibility colour with a strip of retroreflective tape across the top from front to back and on the sides.

41.7 TRAFFIC CONTROL PERSONNEL

Traffic control persons (flaggers) keep motorists, pedestrians and workers safe as they pass by temporary road or site construction sites. All Traffic Control Personnel (TCP) must be given necessary PPE, tools and applicable training.

A traffic control person may be used only

- if the use of signs and other traffic control devices and procedures alone cannot provide effective traffic control, or
- during emergency or brief duration work if it is not practicable to control traffic with signs and other devices and procedures

One or more traffic control persons should be used if

- it is necessary to institute a one-way traffic system by or through a work zone and the circumstances do not allow self-regulating single lane traffic controlled by signs and other devices as specified in the Traffic Control Manual, and a traffic signal system is not used,
- work-related traffic cannot safely self-regulate to move in or out of the work area or safely coordinate with other traffic,
- an existing traffic control system, or an existing traffic signal light system, is not adequate to regulate traffic,
- the work encroaches into an intersection so as to interfere with regular traffic movement,

- traffic speed or volume is a hazard to workers while setting up or removing other traffic control devices, or
- other traffic control devices are not available in an emergency situation.

Their work is usually required in the following environments:

- Where a worker, equipment or other obstruction blocks all or part of a traveled roadway
- Work interferes with regular traffic movement
- When traffic is reduced to one lane in a construction zone
- When vehicle traffic is not regulated by other devices or signage

Where dangers, emergency situations, or lack of adequate control cause an unsafe environment from motorists, equipment operators, pedestrians and workers.

41.7.1 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Flag personnel must wear the appropriate PPE on the jobsite.

- High Visibility vests If a worker is designated by Control Tech to control traffic, Control Tech must ensure that the designated traffic controller wears a highly visible piece of clothing that covers at least the top half of his/her body and clearly identifies the worker as a designated traffic controller and is retro-reflective if the worker is controlling traffic in the dark or visibility is poor. High Visibility vests must meet CSA reflectivity standards, have adjustable fit and also have a tear-away feature if the garment is a nylon vest.
- Radio communication Each TCP must have a 2 way radio with specified channels to be able to communicate with other TCPs as well as equipment operators.

41.8 EMERGENCY PLAN

In the case of a situation requiring the access of Emergency Responders to a particular work zone location, the following will been implemented:

Immediately after the Emergency Responders have been dispatched, two pre-selected workers will be required to create an access to the work zone by opening the closure. The two pre-selected workers will then await the arrival of the Emergency Responders and guide them to the emergency situation.

42.0 TRANSPORTATION OF DANGEROUS GOODS

42.1 PURPOSE

These guidelines and requirements are designed to promote public safety during the transportation of dangerous goods for operations. The material in this document does not take precedence over applicable government legislation which all employees must follow. TDG is governed by the Transportation of Dangerous Goods Act and is designed to protect the public, the environment and property from hazardous goods that are being transported.

42.2 SCOPE

These guidelines apply to all Control Tech operations. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

The scope of the legislation not only applies to anyone transporting these goods but to everyone who is required to handle these materials including; packers, shippers, receivers and warehouse workers.

42.3 DEFINITIONS

Anticipated Release– An incident has occurred and dangerous goods will likely have to be transferred to another means of containment or a means of containment is damaged to the extent that its integrity is compromised and dangerous goods could be released or a means of containment is lost in navigable waters.

CANUTEC - Canadian Transport Emergency Center of the Department of Transport. In the event of an emergency involving dangerous goods, call CANUTEC at 1-888-CAN-UTEC (226-8832), 613-996-6666 or *666 on a cellular phone. CANUTEC's emergency response advisors provide immediate advice over the phone about the actions to take and to avoid during a dangerous goods emergency. They can also send technical information to local authorities responsible for responding to emergencies by email or fax during an incident.

Consignor - is the person who handles or offers dangerous goods for transport. A person in Canada who is named in a shipping document as the consignor, who imports or who will import dangerous goods into Canada or the person has possession of dangerous goods immediately before they are in transport. A person may be both a consignor and a carrier of the same consignment, for example, a manufacturer who also transports the dangerous goods he or she produces.

A person may be both a consignor and a carrier of the same consignment, for example, a manufacturer who also transports the dangerous goods he or she produces

Consignee - is the intended receiver of the dangerous goods the consignor has offered for transport

Carrier - is the person or company that accepts possession of, handles and transports dangerous goods from the consignor (person offering them for transport) to the consignee (person who will receive them)

Dangerous Goods - a product, substance or organism included by its nature or by the regulations in any of the classes listed in the schedule to the Act

Dangerous Goods Mark - A symbol, device, sign, label, placard, letter, word, number or abbreviation, or any combination of those things, that is to be displayed to indicate the presence or nature of danger on dangerous goods, or on a means of containment or means of transport used in importing, offering for transport, handling or transporting dangerous goods.

ERAP - A plan that outlines what is to be done if there is an accident involving certain dangerous goods and that is in accordance with the regulation Part 7, Emergency Response Assistance Plan.

Facility - In the transport of dangerous goods, a facility is a permanent or temporary building (or part of a building) used for the handling of dangerous goods.

Handling - loading, unloading, packing or unpacking dangerous goods in a means of containment for the purposes of, in the course of or following transportation and includes storing them in the course of transportation.

Means of Containment - A container or packaging, or any part of a means of transport that is or may be used to contain goods.

Means of Transport - A road or railway vehicle, aircraft, ship, pipeline or any other contrivance that is or may be used to transport persons or goods.

Release - A discharge, emission, explosion, outgassing or other escape of dangerous goods, or any component or compound evolving from dangerous goods, from a means of containment being used to handle or transport the dangerous goods, or an emission, from a means of containment being used to handle or transport dangerous goods, of ionizing radiation that exceeds a level or limit established under the Nuclear Safety and Control Act

- A tank is punctured in an accident and gasoline drizzles out.
- A test tube containing infectious material falls to the ground and breaks during preparation for transport.
- A pallet of damaged lithium batteries releases hydrogen and catches fire.
- Gases endanger public safety while venting the container.

Undeclared or miss declared Dangerous Goods - safety marks are incorrect on or missing from the means of containment, or not identified according to the rules for shipping documents.

Unlawful Interference – knowingly interfering or acting against the regulations.

42.4 TRANSPORTATION OF DANGEROUS GOODS (TDG) TRAINING REQUIREMENTS

A person who handles, offers for transport or transports dangerous goods shall be adequately trained and hold a training certificate or perform those activities in the presence and under the direct supervision of a person who is adequately trained and who holds a training certificate.

All training shall be documented and certificates of training verified with the trainer by Control Tech.

Control Tech must not direct nor allow an employee to handle, offer for transport, or transport dangerous goods unless the employee is adequately trained and holds a training certificate or performs those activities in the presence and under the direct supervision of a person who is adequately trained and who holds a training certificate.

42.5 TRANSPORTING REQUIREMENTS

42.5.1 PRIOR TO TRANSPORT AND LOADING

The consignor is responsible for classifying dangerous goods before the carrier takes possession. Before allowing a carrier to take possession of dangerous goods for transport, the consignor must determine the classification of the dangerous goods.

The certificate of registration and proof of insurance documentation must be carried in all vehicles.

The consignor is responsible for providing shipping documentation to the carrier of dangerous goods. Before allowing a carrier to take possession of dangerous goods for transport, the consignor must prepare and give to that carrier a shipping document. If the carrier agrees, an electronic copy of the shipping document.

The driver and passengers will follow all local, provincial, and federal laws, including Department of Transportation regulations and codes (if applicable), while operating or riding in a Control Tech vehicle.

All requirements of the Transportation of Dangerous Goods Regulations shall be followed by Control Tech.

Dangerous goods safety marks are affixed to containers of dangerous goods before they are transported. Control Tech must not offer for transport, transport or import a means of containment that contains dangerous goods unless each dangerous goods safety mark is displayed on it.

Vehicles shall be driven with headlights on at all times.

Dangerous goods are adequately secured within the means of containment to prevent accidental release. Control Tech must not handle, offer for transport or transport dangerous goods in a means of containment unless the means of containment is designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of dangerous goods that could endanger public safety.

Containers of dangerous goods are adequately secured on the means of transport to prevent accidental release. Control Tech must load and secure dangerous goods in a means of containment and must load and secure the means of containment on a means of transport in such a way as to prevent, under normal conditions of transport, damage to the means of containment or to the means of transport that could lead to an accidental release of the dangerous goods.

42.5.2 TRIP INSPECTIONS

Prior to operating a company vehicle a “walk around” and visual inspection is mandatory to ensure the vehicle is in safe operating condition and ensure the surrounding area is free of any unseen hazards.

The driver shall inspect the vehicle prior to operating it at the beginning of a work shift and after he ceases to operate it at the end of a work shift. An inspection carried out must include an inspection of the following equipment - lighting devices and reflectors, tires, coupling devices, wheels and rims, service brake, including the trailer brake connections, parking brake, steering mechanism, horn, windshield wipers, rear vision mirrors and all required emergency equipment.

The driver shall inform Control Tech of any defects or deficiency that would affect the safe operation of the vehicle. When Control Tech receives a notice of defect in respect to a Control Tech vehicle it shall be repaired or otherwise modified, or repaired or modified in accordance with instructions provided by the manufacturer. If instructions are not given by the manufacturer the vehicle will be repaired or otherwise modified until safe to operate.

42.5.3 REFUELING VEHICLES

Vehicle engines must be off before refueling begins. Smoking is not permitted during the refueling process. Note: Due to concerns surrounding the potential for cellular phones to cause the ignition of gas vapours, cellular phones must not be worn or used during refueling of gas powered vehicles.

42.6 CLASSES OF DANGEROUS GOODS

Class 1 – Explosives, including explosives within the meaning of the "Explosives Act"

Class 2 – Gases: compressed, deeply refrigerated, liquefied or dissolved under pressure

Class 3 – Flammable and combustible liquids

Class 4 – Flammable solids; substances liable to spontaneous combustion; substances that on contact with water emit flammable gases

Class 5 – Oxidizers Substances and Organic Peroxides

Class 6 – Poisonous (toxic) and infectious substances

Class 7 – Radioactive Materials. Nuclear substances, within the meaning of the "Nuclear Safety and Control Act", that are radioactive

Class 8 – Corrosive

Class 9 – Miscellaneous Products, Substances or Organisms. Miscellaneous products, substances or organisms considered by the Governor in Council to be dangerous to life, health, property or the environment when handled, offered for transport or transported and prescribed to be included in this class

42.7 REPORTING REQUIREMENTS

Accidental releases or spills of dangerous goods of any quantity must be reported to your supervisor or dispatcher immediately.

Accidental releases or spills of dangerous goods, in the amounts listed below, must be reported immediately.

The transportation of dangerous goods act, 1992 (TDG Act) requires that any person who has the charge, management or control of a means of containment (e. G. A driver, a company representative, a shipmaster, a train operator etc.) shall report any release or anticipated release (e.g. Spills, accidents), loss or theft of dangerous goods that is or could be in excess of a quantity or concentration specified by regulation from the means of containment if it endangers, or could endanger, public safety.

While each person who has possession of the dangerous goods at the time of an accidental release, a “dangerous goods accident” or a “dangerous goods incident” must make an immediate report, if one person makes the immediate report, the other persons are not required to make additional immediate reports.

42.8 ACCIDENTAL RELEASE OF DANGEROUS GOODS

In the event of an accidental release of dangerous goods from a means of containment, a person who has possession of the dangerous goods at the time of the accidental release must make an immediate report of the accidental release if the accidental release consists of a reportable quantity of dangerous goods or a reportable emission of radiation as described in the Table in Section 8.1 of the TDG Regulations. The person must make an immediate report to:

- the appropriate provincial authority
- the person’s employer
- the consignor of the dangerous goods
- for a road vehicle, the owner, lessee or charterer of the road vehicle

- for a railway vehicle, CANUTEC at (613) 996-6666
- for a ship, CANUTEC at (613) 996-6666, a Vessel Traffic Services Centre or a Canadian Coast Guard radio station
- for an aircraft, an aerodrome or an air cargo facility, CANUTEC at (613) 996-6666 and the nearest Regional Civil Aviation Office of the Department of Transport and, if the aerodrome is an airport, the operator of the airport
- for Class 1, Explosives
- Class 6.2, Infectious Substances, CANUTEC at 613-996-6666; and SOR/2008-34
- for an accidental release from a cylinder that has suffered a catastrophic failure, CANUTEC at (613) 996-6666.

42.8.1 TYPES OF REPORTS REQUIRED BY TRANSPORT CANADA

Part 8 of the TDG Regulations (Reporting Requirements) requires a number of different report types. When certain conditions are met, persons subject to the TDG Regulations must submit one of the report types below.

This guide presents the conditions for each type of report for reference only. To be certain whether or not you need to make a report, please consult Part 8 of the TDG Regulations.

REPORTS FOR THE TRANSPORT OF DANGEROUS GOODS BY ROAD, RAIL AND MARINE

Emergency Report – Road, Rail or Marine (Section 8.2 of the TDG Regulations)
- https://www.tc.gc.ca/eng/tdg/publications-guide-1300.html#s3

Release or Anticipated Release Report – Road, Rail or Marine (Section 8.4 of the TDG Regulations)
- https://www.tc.gc.ca/eng/tdg/publications-guide-1300.html#s4

30-Day Follow-up Report (Section 8.6 of the TDG Regulations)
- https://www.tc.gc.ca/eng/tdg/publications-guide-1300.html#s10

REPORTS RELATING TO SECURITY – ALL MODES OF TRANSPORT

Loss or Theft Report (Section 8.16 of the TDG Regulations)
- https://www.tc.gc.ca/eng/tdg/publications-guide-1300.html#s7

Unlawful Interference Report (Section 8.18 of the TDG Regulations)
- https://www.tc.gc.ca/eng/tdg/publications-guide-1300.html#s8

42.8.2 REPORTING CLASSES & QUANTITIES

CLASS	PACKING GROUP OR CATEGORY	QUANTITY
1	II	Any quantity
2	Not applicable	Any quantity
3, 4, 5, 6.1 or 8	I or II	Any quantity
3, 4, 5, 6.1 or 8	III	30 L or 30 kg
6.2	A or B	Any quantity
7	Not applicable	A level of ionizing radiation greater than the level established in section 39 of the "Packaging and Transport of Nuclear Substances Regulations, 2015"
9	II or III, or without packing group	30 L or 30 kg

42.8.3 EMERGENCY REPORT

You must report the release or anticipated release exceeding the quantity in the table and endangers or could endanger public safety.
Report to local authorities responsible for responding to emergencies. (Section 8.2 of the TDG Regulation).
Refer to Release or Anticipated Release Report.

42.8.4 RELEASE OR ANTICIPATED RELEASE REPORT

This report is required if the release or anticipated release results in:

- The death of a person
- The treatment of a person's injuries by a health care professional
- An evacuation or shelter in place
- The closure of a facility, road, main railway line, main waterway
- The means of containment has been damaged so that its integrity is compromised
- The center sill or stub sill of a tank car is broken or has a crack in the metal of at least 15 cm

Report must be made to:

CANUTEC, at 1-888-CAN-UTEC (**1-888-226-8832**) or **613-996-6666** or ***666** on a cell phone

The Consignor

In the case of dangerous goods included in Class 7, Radioactive Materials, the **Canadian Nuclear Safety Commission** 1-844-879-0805 or 613-995-0479

For a ship, a Vessel Traffic Services Centre or a Canadian Coast Guard radio station.

42.8.5 UNLAWFUL INTERFERENCE REPORT

Unlawful Interference Report must be made as soon as possible after the discovery of unlawful interference with dangerous goods, while they were being imported, offered for transport, handled or transported. An unlawful release may include:

- A cylinder valve is purposely damaged or altered.
- The dangerous goods in a container do not match the safety marks displayed on it (ammonia in propane cylinders for making of illegal drugs).
- A means of containment is purposely damaged or altered.
- The composition of dangerous goods in a container is purposely altered to lower their value.
- Shipping document information is purposely altered.
- A means of containment (tank, etc.) is vandalized.

Report must be made to:

CANUTEC, at 1-888-CAN-UTEC (**1-888-226-8832**) or **613-996-6666** or ***666** on a cell phone

Natural Resources Canada - In the case of dangerous goods included in Class 1, Explosives included in Class 1.1, 1.2, 1.3, 1.4 (except for 1.4S), 1.5 or 1.6, a Natural Resources Canada inspector at **613-995-5555**

Canadian Nuclear Safety Commission - In the case of dangerous goods included in Class 7, Radioactive Materials, the Canadian Nuclear Safety Commission **1-844-879-0805** or **613-995-0479** the CNSC Duty Officer emergency telephone line in the event of an emergency involving a nuclear facility or radioactive materials, including:

- any accident involving a nuclear reactor, nuclear fuel facility, or radioactive materials
- lost or damaged radioactive materials

- any threat, theft, smuggling, vandalism, or terrorist activity involving a nuclear facility or radioactive materials

42.8.6 LOSS OR THEFT REPORT

As soon as possible after discovering the loss or theft of dangerous goods referred to in items 1, 2 and 3 while they were being imported, offered for transport, handled or transported, a report must be made to the following persons:

1. **CANUTEC**, at 1-888-CAN-UTEC (**1-888-226-8832**) or **613-996-6666** or ***666** on a cell phone
2. **Natural Resources Canada** - If dangerous goods are Class 1 (Explosives) or listed in Item 1 below, a Natural Resources Canada inspector at **613-995-5555**
3. **Canadian Nuclear Safety Commission** - If dangerous goods are Class 7 (Radioactive Materials)

Any quantity of one of these dangerous goods:

- UN1261, NITROMETHANE,
- UN1357, UREA NITRATE, WETTED with not less than 20% water by mass,
- UN1485, POTASSIUM CHLORATE,
- UN1486, POTASSIUM NITRATE,
- UN1487, POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE,
- UN1489, POTASSIUM PERCHLORATE,
- UN1495, SODIUM CHLORATE,
- UN1498, SODIUM NITRATE,
- UN1499, SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE,
- UN1511, UREA HYDROGEN PEROXIDE,
- UN1796, NITRATING ACID MIXTURE with more than 50% nitric acid,
- UN1826, NITRATING ACID MIXTURE, SPENT, with not more than 50% nitric acid,
- UN1942, AMMONIUM NITRATE with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance,
- UN2014, HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary),
- UN2015, HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 60% hydrogen peroxide; or HYDROGEN PEROXIDE, STABILIZED,
- UN2031, NITRIC ACID, other than red fuming,
- UN2032, NITRIC ACID, RED FUMING,
- UN3149, HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED,
- UN3370, UREA NITRATE, WETTED, with not less than 10% water by mass;

Any quantity of dangerous goods in the following primary and subsidiary classes:

- Explosives included in Class 1.1, 1.2 or 1.3,
- Toxic gases included in Class 2.3,
- Organic peroxides included in Class 5.2, Type B, liquid or solid, temperature controlled,
- Toxic substances included in Class 6.1 and Packing Group I,
- Infectious substances included in Class 6.2,
- Radioactive materials included in Class 7;

A total quantity of 450 kg or more, in the case of dangerous goods in the following primary and subsidiary classes:

- Explosives included in Class 1.4 (except for 1.4S), 1.5 or 1.6,
- Flammable gases included in Class 2.1,

- Flammable liquids included in Class 3,
- Desensitized explosives included in Class 3 or 4.1,
- Substances liable to spontaneous combustion, pyrophoric solids or liquids, included in Class 4.2 and Packing Group I or II,
- Water-reactive substances included in Class 4.3 and Packing Group I or II,
- Oxidizing substances included in Class 5.1 and Packing Group I or II,
- Corrosives included in Class 8 and Packing Group I or II.

42.8.7 IMMEDIATE REPORTING INFORMATION

The immediate report must include as much of the following information as is known at the time of the report:

- the shipping name or UN number of the dangerous goods
- the quantity of dangerous goods that
    - was in the means of containment before the accidental release, the "dangerous goods accident" or the "dangerous goods incident", and
    - is known or suspected to have been released
- a description of the condition of the means of containment from which the dangerous goods were released, including details as to whether the conditions of transport were normal when the means of containment failed
- for an accidental release from a cylinder that has suffered a catastrophic failure, a description of the failure
- For example, there was an explosion, a valve sheared off or there was a crack in the cylinder
- the location of the accidental release, the "dangerous goods accident" or the "dangerous goods incident"
- for a ship, the position of the ship and the next location at which the ship will be at anchor or alongside a fixed facility
- the number of deaths and injuries resulting from the accidental release, the "dangerous goods accident" or the "dangerous goods incident" and
- an estimate of the number of people evacuated from private residences, public areas or public buildings as a result of the accidental release, the "dangerous goods accident" or the "dangerous goods incident"

42.8.8 30-DAY FOLLOW-UP REPORT

If Control Tech was responsible for submitting a Release or Anticipated Release Report or a Dangerous Goods Accident or Incident Report, then Control Tech must also submit a follow-up report if the person who had possession of the dangerous goods at the time of the accidental release, the "dangerous goods accident" or the "dangerous goods incident", if employed by the company.

The follow-up report must be made, in writing, to the Director General within 30 days after the occurrence of the accidental release, the "dangerous goods accident" or the "dangerous goods incident".

The follow-up report must include the following information

- the name and address of the place of business of the person providing the information and the telephone number, including the area code, at which that person may be contacted
- the date, time and location of the accidental release, the "dangerous goods accident" or the "dangerous goods incident"
- the name and address of the place of business of the consignor
- the classification of the dangerous goods

- the estimated quantity of dangerous goods released and the total quantity of dangerous goods in the means of containment before the accidental release, the "dangerous goods accident" or the "dangerous goods incident"
- a description of the means of containment involved based on the identification markings and a description of the failure or damage to the means of containment, including how the failure or damage occurred
- for an accidental release from a cylinder that has suffered a catastrophic failure, the certification safety marks and a description of the failure
- For example, there was an explosion, a valve sheared off or there was a crack in the cylinder.
- the number of deaths and injuries resulting from the accidental release, the "dangerous goods accident" or the "dangerous goods incident"
- an estimate of the number of people evacuated from private residences, public areas or public buildings; and
- if an emergency response assistance plan was activated, the name of the person who responded to the emergency in accordance with the emergency response assistance plan

Report must be submitted by email, fax, or mail to:

Transportation of Dangerous Goods Directorate
Transport Canada
Place de Ville, Tower C, 9th Floor
330 Sparks Street
Ottawa, Ontario K1A 0N5
Fax: 613-990-2917
Email: dor-rcd@tc.gc.ca

42.9 THE SELECTION OF A MEANS OF CONTAINMENT FOR DANGEROUS GOODS

Several factors influence the selection of a means of containment, such as:

- Class of dangerous goods
- Type and size of the means of containment
- Mode of transport
- Destination

42.9.1 CONTAINER SPECIFICATIONS

Cylinders, Spheres and Tubes - (16-0099E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0099_BO_PD
Highway Tanks - (16-0097E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0097_BO_PD
Intermediate Bulk Containers (IBC) and Large Packaging (LP) - (16-0100E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0100_BO_PD
Portable Tanks - (16-0098E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0098_BO_PD
Small Containers - (16-0101E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0101_BO_PD
Tank Cars - (16-0094E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0094_BO_PD
TC Portable Tanks and Nurse Tanks - (16-0095E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0095_BO_PD

Ton Containers - (16-0096E)
http://wwwapps.tc.gc.ca/Corp-Serv-Gen/5/forms-formulaires/download/16-0096_BO_PD

42.10 EMERGENCY PHONE NUMBERS FOR LOCAL AUTHORITIES RESPONSIBLE FOR RESPONDING TO EMERGENCIES

PROVINCE	AUTHORITY
Alberta	**911** (or local police) and relevant provincial authorities (**1-800-272-9600**) or Canadian Coast Guard (**1-800-889-8852**)
British Columbia	**911** (or local police) and Provincial Emergency Program (**1-800-663-3456**) or Canadian Coast Guard (**1-800-889-8852**)
CANUTEC	**1-888-CAN-UTEC** (**226-8832**), **613-996-6666**, or ***666** on a cellular phone
Canadian Nuclear Safety Commission	CNSC duty officer emergency line (**613-995-0479**)
Natural Resources Canada	**613-995-5555**

42.10.1 NEW: GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)

PHYSICAL HAZARDS	
EXPLOSIVE	
	Unstable explosives Explosives, divisions 1.1, 1.2, 1.3, 1.4 Self-reactive substances and mixtures, types A, B Organic peroxides, types A, B
FLAMMABLE	
	Flammable gases, category 1 Flammable aerosols, categories 1, 2 Flammable liquids, categories 1, 2, 3 Flammable solids, categories 1, 2 Self-reactive substances and mixtures, types B, C, D, E, F Pyrophoric liquids, category 1 Pyrophoric solids, category 1 Self-heating substances and mixtures, categories 1, 2 Substances and mixtures, which in contact with water, emit flammable gases, categories 1, 2, 3 Organic peroxides, types B, C, D, E, F
OXIDIZING	
	Oxidizing gases, category 1 Oxidizing liquids, categories 1, 2, 3 Oxidizing solids, categories 1, 2, 3
COMPRESSED GAS	
	Compressed gases Liquefied gases Refrigerated liquefied gases Dissolved gases
CORROSIVE	
	Corrosive to metals, category 1
no pictogram required	Explosives, divisions 1.5, 1.6 Flammable gases, category 2 Self-reactive substances and mixtures, type G Organic peroxides, type G

HEALTH HAZARDS	
TOXIC	
	Acute toxicity (oral, dermal, inhalation), categories 1, 2, 3
CORROSIVE	
	Skin corrosion, categories 1A, 1B, 1C Serious eye damage, category 1
IRRITANT	
	Acute toxicity (oral, dermal, inhalation), category 4 Skin irritation, categories 2, 3 Eye irritation, category 2A Skin sensitization, category 1 Specific target organ toxicity following single exposure, category 3 Respiratory tract irritation Narcotic effects ***Not used[3]*** with the "skull and crossbones" pictogram for skin or eye irritation if: the "corrosion" pictogram also appears the "health hazard" pictogram is used to indicate respiratory sensitization
HEALTH HAZARD	
	Respiratory sensitization, category 1 Germ cell mutagenicity, categories 1A, 1B, 2 Carcinogenicity, categories 1A, 1B, 2 Reproductive toxicity, categories 1A, 1B, 2 Specific target organ toxicity following single exposure, categories 1, 2 Specific target organ toxicity following repeated exposure, categories 1, 2 Aspiration hazard, categories 1, 2
no pictogram required	Acute toxicity (oral, dermal, inhalation), category 5 Eye irritation, category 2B Reproductive toxicity – effects on or via lactation

ENVIRONMENTAL HAZARDS	
ENVIRONMENTALLY DAMAGING	
	Acute hazards to the aquatic environment, category 1 Chronic hazards to the aquatic environment, categories 1, 2
no pictogram required	Acute hazards to the aquatic environment, categories 2, 3 Chronic hazards to the aquatic environment, categories 3, 4

TRANSPORTATION

CLASS 1: EXPLOSIVES

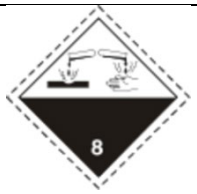
 **Divisions 1.1–1.3**	**Explosives** Division 1.1: Substances and articles which have a mass explosion hazard Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard ***Note:*** The asterisks are replaced by the class number and compatibility code
 **Division 1.4**	**Explosives** Substances and articles which are classified as explosives but which present no significant hazard ***Note*** The asterisk is replaced by the compatibility code
 **Division 1.5**	**Explosives** Very insensitive substances which have a mass explosion hazard ***Note:*** The asterisk is replaced by the compatibility code
 **Division 1.6**	**Explosives** No hazard statement **Note:** The asterisk is replaced by the compatibility code

CLASS 2: GASES

 **Division 2.1**	**Flammable gases** Gases which at 20 °C and a standard pressure of 101.3 kPa: are ignitable when in a mixture of 13 per cent or less by volume with air; or have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit ***Note:*** The symbol, number and border line may be shown in white instead of black
 **Division 2.2**	**Non-flammable non-toxic gases** Gases which: are asphyxiant – gases which dilute or replace the oxygen normally in the atmosphere; or are oxidizing – gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does; or do not come under the other divisions; ***Note:*** The symbol, number and border line may be shown in white instead of black
 **Division 2.3**	**Toxic gases** Gases which: are known to be so toxic or corrosive to humans as to pose a hazard to health; or are presumed to be toxic or corrosive to humans because they have an LC50 value equal to or less than 5000 ml/m3 (ppm)

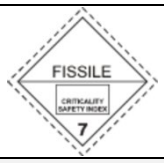
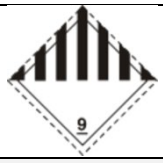
CLASSES 3 AND 4: FLAMMABLE LIQUIDS AND SOLIDS	
 **Class 3**	**Flammable liquids** Liquids which have a flash point of less than 60 °C and which are capable of sustaining combustion ***Note:*** The symbol, number and border line may be shown in white instead of black
 **Division 4.1**	**Flammable solids, self-reactive substances and solid desensitized explosives** Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive substances which are liable to undergo a strongly exothermic reaction; solid desensitized explosives which may explode if not diluted sufficiently
 **Division 4.2**	**Substances liable to spontaneous combustion** Substances which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire
 **Division 4.3**	**Substances which in contact with water emit flammable gases** Substances which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities ***Note*** The symbol, number and border line may be shown in white instead of black

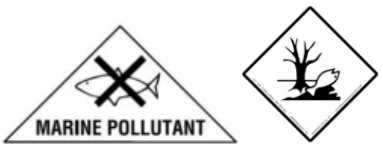
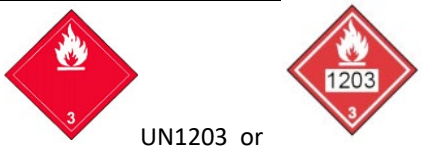
OTHER GHS TRANSPORT CLASSES	
 **Division 5.1**	**Oxidizing substances** Substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material
 **Division 5.2**	**Organic peroxides** Organic substances which contain the bivalent –O–O– structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals Note The symbol and upper border line may be shown in white instead of black

 **Division 6.1**	**Toxic substances** Substances with an LD50 value ≤ 300 mg/kg (oral) or ≤ 1000 mg/kg (dermal) or an LC50 value ≤ 4000 ml/m3 (inhalation of dusts or mists)
 **Class 8**	**Corrosive substances** Substances which: cause full thickness destruction of intact skin tissue on exposure time of less than 4 hours; or exhibit a corrosion rate of more than 6.25 mm per year on either steel or aluminium surfaces at 55 °C

NON-GHS TRANSPORT PICTOGRAMS

The following pictograms are included in the UN Model Regulations but have not been incorporated into the GHS because of the nature of the hazards.

					
Class 6.2	**Class 7**				**Class 9**
Infectious substances	Radioactive material				Miscellaneous dangerous substances and articles

		
Fumigation Sign	Elevated Temperature Sign	Mixed Load Shipment
		
Orange Panel	Marine Pollutant Mark	
 UN1203 or	 or	
Small Means of Containment	Large Means of Containment	

43.0 VEHICLE SAFETY POLICY

Employees operate company owned, leased, rental or personal vehicles as part of their jobs. Employees are expected to operate vehicles according to traffic legislation requirements as well as safely to prevent accidents which may result in injuries and property loss.

It is the policy of Control Tech to provide and maintain a safe working environment to protect our employees and the citizens of the communities where we conduct business from injury and property loss. The company considers the use of automobiles part of the working environment.

The company is committed to promoting a heightened level of safety awareness and responsible driving behavior in its employees. Our efforts and the commitment of employees will prevent vehicle accidents and reduce personal injury and property loss claims.

This program requires the full cooperation of each driver to operate their vehicle safely and to adhere to the responsibilities outlined in the Motor Vehicle Safety Program.

Elements of this program include:

- Assigning responsibilities at all levels of employment.
- Vehicle use and insurance requirements.
- Employee driver's license checks and identification of high risk drivers.
- Accident reporting and investigation.
- Company Accident Review Committee.
- Vehicle selection and maintenance.
- Training standards.
- Safety legislation.

The material in this document does not take precedence over applicable government legislation which all employees must follow.

_____
Dustin Richarde
08/21/2018

_____
Greg Kjemhus
08/21/2018

_____
Tali Hughes
08/21/2018

43.1 SCOPE

This policy applies to employees who operate vehicles on company business and will be reviewed by managers to ensure full implementation and compliance.

43.2 RESPONSIBILITIES

President

- The company president is responsible for directing an aggressive vehicle safety program.

Management

- Implement the Motor Vehicle Safety Program in their areas of responsibility.
- Establish measurement objectives to ensure compliance with the program.
- Provide assistance and the resources necessary to implement and maintain the program.

Supervisors

- Investigate and report all accidents involving a motor vehicle used in performing company business.
- Forward all accident reports to the Vehicle Safety Coordinator.
- Be responsible for taking appropriate action to manage high risk drivers as defined by this program
- Provide driver training either internally or through external means for high risk drivers.

Vehicle Safety Coordinator

- Issue periodic reports of losses for the president's review.
- Review motor vehicle accident reports as part of the Company Accident Review Board.
- Revise and distribute changes to the Motor Vehicle Safety Program to managers, supervisors and drivers as necessary.
- Maintain appropriate records.
- Check licenses /abstracts regularly for validation and keep copies of licenses in driver files.

Drivers

- Must possess a valid driver's license appropriate to the type of vehicle being driven
- Always operate a motor vehicle in a safe manner
- Follow all traffic legislation including, local, provincial & federal
- Employees are responsible for possessing a valid driver’s license for the type of motor vehicle they operate.
- Maintain a valid driver's license and minimum insurance requirements on personal vehicles used in company business.
- Maintain assigned vehicles according to established maintenance standards.

43.3 DRIVER SELECTION

43.3.1 DRIVER EVALUATION

Employees will be evaluated and selected based on their driving ability. To evaluate employees as drivers, management will:

1. Ensure that drivers possess a valid driver's license appropriate to the type of vehicle being driven.
2. A copy of license will be kept in the employee file.
3. Review past driving performance and work experience for all drivers of company owned vehicles through previous employer’s reference checks and by obtaining and reviewing current driver’s abstract.

4. Obtain driver's abstract from driver, current within 30 days of hire and then annually for all drivers of company owned vehicles (more frequently if reasons warrant). A driver abstract contains information on the operator's license, conviction information, demerit points, and suspensions.

The following criteria establish the identity of high risk drivers. A driver is unacceptable if the driver's accident/violation history in the past year includes one or more of the following moving violation convictions:

- Driving under the influence of alcohol or drugs (DWI).
- Hit and run.
- Failure to report an accident.
- Negligent homicide arising out of the use of a motor vehicle.
- Operating during a period of suspension or revocation.
- Using a motor vehicle for the commission of a felony.
- Operating a motor vehicle without the owner's authority.
- Permitting an unlicensed person to drive.
- Reckless driving.
- Speeding (3 or more in a 3 year period).
- Two preventable accidents in a 12 month period.

43.4 ACCIDENT RECORD KEEPING, REPORTING AND INVESTIGATION

This company considers elimination of motor vehicle accidents as a major goal. To meet this objective, all accidents must be reported to management immediately, investigated, documented and reviewed by the Company Accident Review Board.

The investigation identifies the need for:

1. A more intensive driver training and/or remedial training.
2. Improved driver selection procedures.
3. Improve vehicle inspection and/or maintenance activities.
4. Changes in traffic routes.

Motor vehicle accident recordkeeping procedures consist of the following components:

1. Documentation of causes and corrective action.
2. Management review to expedite corrective action.
3. Analysis of accidents to determine trends, recurring problems and the need for further control measures.

43.4.1 RESPONSIBILITIES

Implementation of these procedures remains the responsibility of both the driver and manager.

Driver

Since the driver is the first person at the accident scene, he/she will initiate the information-gathering process as quickly and thoroughly as is feasible.

Management

Management will obtain accident data from the driver through the Vehicle Accident Report form and/or by verbal communication. It is important for management to determine the extent of the accident, especially if it involves injuries or death to the driver, passengers, or other parties.

Management will immediately proceed with a formal investigation to determine the underlying causes as well as what can be done to prevent similar occurrences. The accident report will be forwarded to the

insurance claims office along with any additional support data (e.g., witness statements, photographs, police reports, etc.).

43.4.2 PREVENTABLE/NON-PREVENTABLE ACCIDENTS

The following definitions relate to motor vehicle accidents:

A motor vehicle accident is defined as "any occurrence involving a motor vehicle which results in death, injury or property damage, unless such vehicle is properly parked. Who was injured, what property was damaged and to what extent, where the accident occurred, or who was responsible, are not relative factors".

A preventable accident is defined as "any accident involving the vehicle, unless properly parked, which results in property damage or personal injury and in which the driver failed to do everything he/she reasonably could have done to prevent or avoid the accident".

NOTE A properly parked motor vehicle is one that is completely stopped and parked where it is legal and prudent to park such a vehicle or to stop to load/unload property. A vehicle stopped to load/unload passengers is not considered parked.

NOTE Parking on private property will be governed by the same regulations that apply on public streets and highways. A vehicle stopped in traffic in response to a sign, traffic signal or the police is not considered parked.

The determination of preventability of an accident is the function of the Company Accident Review Board.

43.4.3 PROCEDURES TO FOLLOW IN THE EVENT OF AN INCIDENT/ACCIDENT

Employees will take the following actions when there are injuries to persons and/or damage to other vehicles or property:

1. If possible, move the vehicle to a safe location out of the way of traffic. Call for medical attention if anyone is hurt.
2. Secure the names and addresses of drivers and occupants of any vehicles involved, their operator's license numbers, insurance company names and policy numbers, as well as the names and addresses of injured persons and witnesses. Record this information on the Accident Report form (in the reporting packet). Do not discuss fault with, or sign anything for anyone except an authorized representative of Control Tech, a police officer, or a representative of the Control Tech insurance company.
3. Get names and phone numbers of witnesses to the accident. (witness cards are in the reporting package)
4. Immediately notify the Vehicle Safety Coordinator. If any injuries were involved and the Vehicle Safety Coordinator is not available, contact your supervisor immediately.
5. You will be contacted by the Vehicle Safety Coordinator to advise you how to arrange for repairs to the vehicle. Do not have the vehicle repaired until you receive authorization from the Vehicle Safety Coordinator.

When there is theft of or damage to your vehicle only:

1. If you did not witness the damage to the vehicle, you must notify the local police department immediately.
2. Immediately notify Vehicle Safety Coordinator.
3. You will be contacted by the Vehicle Safety Coordinator to advise you how to arrange for repairs or replacement of the vehicle. Do not have the vehicle repaired until you receive authorization from the Vehicle Safety Coordinator.
4. Send a copy of the police report along with a memo outlining any additional information to the Vehicle Safety Coordinator.

NOTE: Accident reporting kits: every company vehicle should have an accident reporting kit in the glove box. This should include an accident report form, pen or pencil, and an inexpensive or disposable camera. The committee will report to the Vehicle Safety Coordinator within 3 working days the results of their review. The Vehicle Safety Coordinator will take the appropriate steps and communicate the results to the affected driver and supervisor.

43.5 GENERAL REQUIREMENTS

Proper selection and maintenance of equipment are important aspects of this program.

Reduced operational costs and accidents from vehicle defects are the direct result of a well implemented maintenance policy.

43.5.1 VEHICLE SELECTION

Selection of vehicles begins with understanding the wrong equipment can result in excessive breakdowns, create hazards to personnel, incur costly delays and contribute to poor service and customer complaints. The company will purchase vehicles designed for their intended use.

43.5.2 VEHICLE INSPECTION

Drivers are responsible for ensuring the vehicle is maintained in safe driving condition. Pre-use inspections must be completed before operating motor vehicles, and regular maintenance performed as per manufacturer guidelines

Inspections will be recorded, signed by the operator, and the document provided to an administrator and retained in company files. This is to include operational and safety equipment inspections on the process/equipment, load securement, etc. This consists of a walk-around the vehicle to check for any defects to body and ensure there are no barriers blocking the path and checking all gauges lights, mirrors, windows and tires to ensure no defects to the vehicle. Company-owned vehicles shall have a maintenance program in place meeting the minimum manufacturer's recommendation.

In the event that you are driving personal vehicles for company business the above requirements must still be completed. The records of inspections and maintenance of vehicle must be made available to a Control Tech representative upon request.

43.5.3 VEHICLE MAINTENANCE

Vehicle maintenance can take the form of three distinct programs: preventive maintenance, demand maintenance, and crisis maintenance. While all three types have their role in the Motor Vehicle Safety Program, the most cost effective control is preventive maintenance.

The groundwork for a good preventive maintenance program starts with management. A review of manufacturer's specifications and recommendations for periodic preventive maintenance should be integrated with the actual experience of the vehicles.

Preventive maintenance (PM) is performed on a mileage or time basis. Typical PM includes oil/filter changes, lubrication, tightening belts and components, engine tune-ups, brake work, tire rotation, hose inspection/replacement and radiator maintenance.

Demand maintenance is performed only when the need arises. Some vehicle parts are replaced only when they actually fail. These include light bulbs, window glass, gauges, wiring, air lines, etc. Other “demand maintenance” items involve vehicle components that are worn based on information from the vehicle condition report. These include tires, engines, transmissions, universal joints, bushings, batteries, etc. Since

these situations are identified through periodic vehicle inspection, they can actually be classified within the PM program.

Crisis maintenance involves a vehicle breakdown while on the road. While situations of this type may happen regardless of the quality of the PM program, it is an expensive alternative to not having an effective preventive maintenance program at all. Crisis maintenance situations should be minimized through proper PM procedures.

43.5.4 RECORD KEEPING

This company's vehicle selection, inspection and maintenance program is only as good as its recordkeeping procedures. Employees will forward all vehicle inspections records of maintenance and repairs performed each month to the Vehicle Safety Coordinator.

43.5.5 DRIVER TRAINING

Drivers hired by this company to operate a motor vehicle will have the basic skills and credentials necessary to perform this function as confirmed through the driver selection process.

New employees, contractor, and temporary hires will receive a copy of this program as part of their initial orientation. A formal orientation program is established to help assure all drivers are presented with the company policy, understand their responsibilities and are familiarized with their vehicle. Areas that must be addressed, with the driver, include:

1. Understand, review and given a copy of the Safety Program.
2. Understand and sign the Vehicle Assignment Agreement
3. Review individual driver's abstract.
4. Understand permitted uses
5. Understand accident reporting & emergency procedures.
6. Understand responsibilities for Traffic Act violations
7. Review operation and controls of vehicle being assigned.
8. Inspect vehicle using Vehicle Inspection Form.'

Remedial Training

Drivers may be required to attend a safe driving school (Defensive Driving course or equivalent) or an alcohol/drug abuse program on their own time and at their own expense if a review of the driver's abstract indicates:

1. One or more violation convictions within any one-year period, or
2. A conviction for driving while under the influence of alcohol or drugs.

Also, depending on the severity of the conviction, the employee's driving privileges may be revoked and/or may result in employment termination.

43.6 DRIVER SAFETY RULES & REGULATIONS

Safety Belts

Seatbelt use is mandatory for the driver and passengers while operating a motor vehicle on company business. The driver is responsible for ensuring passengers wear their safety belts. Children under four years of age or under 40 pounds in weight must be secured in a government approved child safety seat.

Impaired Driving

Operators of motor vehicles must not drive while under the influence of drugs or alcohol. Employees are strictly prohibited from operating a motor vehicle while under the influence of drugs or alcohol. This includes: a) blood alcohol level at or above the local legal limit; b) illegal drugs; and c) prescription medications that cause drowsiness or other conditions that may cause impairment

Cargo Securement

Cargo must be adequately secured on or in motor vehicles. Cargo must be adequately stored and secured to prevent unintentional movement which could cause spillage, damage to the vehicle, or injury to the operator.

Traffic Laws

Operators of motor vehicles must follow all traffic laws while on company business.

Reporting Requirements

Motor vehicle incidents must be reported to the supervisor.

Parking

Pull-through parking techniques are used in parking lots, whenever practicable. Where pull-through techniques cannot be utilized, operators of motor vehicles should back into the parking spot. When backing, it is recommended that a spotter be stationed outside the vehicle to ensure the driver backs safely, whenever practicable

Cell Phones

Handheld use of cell phones and/or texting devices while driving is prohibited. All cell phone use, including hands-free, is prohibited while driving on customer/client property.

Police can charge drivers with careless driving or even dangerous driving (a criminal offence) if they do not pay full attention to the driving task.

Distracted Driving Law

Workers must abide by the “Distracted Driving Laws” that are in effect across Canada. Including but not limited to:

- No handheld electronic device (2-way radios can be used in limited situations – emergency vehicles, pilot vehicles while escorting oversized loads)
- No eating
- No viewing display screens unrelated to driving, such as laptop computers and portable DVD players, is also prohibited while driving.
- No using devices such as GPS systems, stereos, CD and DVD players, radios, cell phones, laptops, PDAs, walkmans and MP3 players
- No reading maps, directions or other material
- No grooming (combing hair, putting on make-up or shaving)
- No eating or drinking
- No taking notes
- No tending to children or pets

Motorcycles

Employees are prohibited from using motorcycles when traveling on company business.

License Suspension

Drivers must notify the Vehicle Safety Coordinator if their license is suspended or revoked.

43.7 GENERAL SAFETY RULES

Employees are not permitted to:

1. Pick up hitchhikers.
2. Accept payment for carrying passengers or materials.
3. Use any radar detector, laser detector or similar devices.
4. Push or pull another vehicle or tow a trailer.
5. Transport flammable liquids or gases unless a DOT or Underwriters' Laboratories approved container is used, and only then in limited quantities.
6. Use of burning flares will be discouraged. The preferred method is the use of reflective triangles.
7. Assist disabled motorists or accident victims beyond their level of medical expertise. If a driver is unable to provide the proper medical care, he/she must restrict his/her assistance to calling the proper authorities. Your safety and well-being is to be protected at all times.

43.8 COMPANY AND PERSONAL PROPERTY

Employees are responsible for company property such as computers, work papers and equipment under their control. The company will not reimburse the employee for stolen personal property.

43.9 VEHICLE USE

43.9.1 COMPANY OWNED VEHICLES

Passenger Cars

Employees authorized by their supervisors will be permitted to operate a passenger car. When the vehicle is driven for personal use, only the employee will be permitted to operate the vehicle. No one under the age of 21 will be permitted to operate the vehicle.

Commercial Vans and Trucks

Employees with appropriate driver's license for the vehicle they are operating, authorization from their supervisor and qualified by provincial standards will be permitted to operate the vehicle. Employees must address loads shall be secured and shall not exceed the manufacturer’s and legal limits for the vehicle.

43.9.2 PERSONAL VEHICLES ON COMPANY BUSINESS

Employees who drive their personal vehicles on company business are subject to the requirements of this program including:

1. Maintaining auto liability insurance with minimum limits of $_____ for bodily injury and $_____ for property damage with combined single limit of $_____.
2. Maintain current state vehicle inspections when required.
3. Maintain their own vehicle in a safe operating condition when driven on company business.
4. Proof of insurance (copy of declaration page) will be sent to _____.
5. Acceptable Motor Vehicle Report (MVR).
6. No ‘business use’ exclusion on personal insurance policy.

43.9.3 RENTAL VEHICLES

1. Rental vehicles will be leased from (INDICATE VENDORS SUCH AS HERTZ, AVIS, ETC.).
2. Collision damage waiver will be refused.

43.9.4 UNAUTHORIZED USE OF VEHICLES

Assigned drivers and other authorized employees will not allow an unauthorized individual to operate a company vehicle. No exceptions! Disciplinary action may be taken.

Additionally, if unauthorized use results in an accident, the responsible employee will be required to make restitution for the damages.

43.9.5 CONTRACTORS AND TEMPORARY HIRE EMPLOYEES

Contractors and temporary employees will be treated as company employees and will comply with the requirements of this program. Failure to meet all requirements will result in the immediate loss of driving privileges.

43.9.6 VEHICLE USE AND INSURANCE REQUIREMENTS.

- Employee driver's license checks and identification of high risk drivers.
- Drivers abstracts submittal (within 30 days of hiring and then annually)
- Accident reporting and investigation.
- Company Accident Review Board.
- Vehicle selection and maintenance.
- Training standards.
- Safety regulations.

44.0 VISITOR ORIENTATION & SIGN IN

44.1 PURPOSE

This program is written to provide directives to managers, supervisors and employees about their responsibilities for the safety of visitor's onsite. The material in this document does not take precedence over applicable government legislation which all employees must follow.

44.2 SCOPE

This program applies to all areas where visitors may be present on site. If site is controlled by a Prime Contractor then the Prime Contractor's program will take precedence.

44.3 RESPONSIBILITIES

Safety Manager

- The designated Safety Manager is responsible for developing and maintaining the program.

Site Supervisor

- Responsible for the implementation and maintenance of the program for their site and ensuring all assets are made available for compliance with the plan.

Employees

- Employees must follow these procedures for the safety of their visitors

44.4 DEFINITIONS

"Visitor" is defined as follows:

19. Any person who is visiting the facility or job site for a short duration and who will not perform work at the site
20. Any Contract employee who does not normally perform extended work at the site such as a delivery driver.

44.5 VISITOR RULES

Listed below are specific safety rules that must be followed in order to ensure your safety and that of our employees.

These rules must be read upon your arrival, followed by your signature in the visitors' register, acknowledging your understanding of these rules and verification of your presence in the area.

Visitors are encouraged to make appointments in advance of their arrival. If an escort is not available due to workload or an emergency, the visitor may be required to reschedule the appointment.

Visitors may be asked to leave the site for not abiding by safety rules, in case of an emergency or because of other demands upon the escort.

Visitors must be made aware of the following upon arrival and must sign in when entering the site and must sign out as they leave the site:

1. No visitors are allowed beyond the main office or Site Security without an assigned escort.
2. Visitors will abide by all facility rules.

3. The following PPE may be required prior to entering the facility or job site:
    - Hard Hat
    - Hearing Protection
    - Impact Resistant Safety Glasses
    - Safety Shoes (Recommended)
    - Outer Layer of Fire Resistant Clothing, when required by Company policy
4. No open flames or smoking is permitted except in designated areas.
5. Cellular telephones will not be permitted in a hazardous atmosphere. Only equipment that is intrinsically safe will be permitted where a hazardous atmosphere is possible unless a hot work permit is completed prior to use.
6. The Company representative will explain the emergency signal (when applicable) to you upon completion of this orientation. In the event you hear an emergency signal, proceed with your escort to the assembly area and wait for instructions.
7. Should you detect a hazardous situation during the course of your visit, alert your escort immediately and exit the facility or job site by taking an evacuation route to the Safe Area / Meeting Location if applicable.
8. If you suffer any injury, no matter how slight, promptly inform your escort.
9. This is a “controlled operation;” visitors should not touch or make any adjustments to knobs, valves, computers or any other types of controls.
10. Alcohol, illegal drugs, firearms, “strike anywhere” matches and plastic butane lighters are prohibited.

VISITOR RULES

THE FOLLOWING RULES ARE IN PLACE TO KEEP YOU SAFE

No visitors are allowed beyond the main office without an assigned escort.

Visitors will abide by all facility rules.

The following PPE may be required prior to entering the facility or job site:

- Hard Hat
- Hearing Protection
- Impact Resistant Safety Glasses
- Safety Shoes (Recommended)
- Outer Layer of Fire Resistant Clothing, when required by Company policy

No open flames or smoking is permitted except in designated areas.

Cellular telephones will not be permitted in a hazardous atmosphere. Only equipment that is intrinsically safe will be permitted where a hazardous atmosphere is possible unless a hot work permit is completed prior to use.

The Company representative will explain the emergency signal (when applicable) to you upon completion of this orientation. In the event you hear an emergency signal, proceed with your escort to the assembly area and wait for instructions.

Should you detect a hazardous situation during the course of your visit, alert your escort immediately and exit the facility or job site by taking an evacuation route to the Safe Area / Meeting Location if applicable.

If you suffer any injury, no matter how slight, promptly inform your escort.

This is a “controlled operation;” visitors should not touch or make any adjustments to knobs, valves, computers or any other types of controls.

Alcohol, illegal drugs, firearms, “strike anywhere” matches and plastic butane lighters are prohibited.

PLEASE SIGN IN & OUT

45.0 WHMIS GHS

45.1 PURPOSE

The Workplace Hazardous Materials Information System / Global Harmonized System (WHMIS GHS) Program was developed by Control Tech to ensure compliance with the Health & Safety legislation. WHMIS is a nationwide system, involving federal and provincial laws that provides information and education about hazardous materials to employees.

WHMIS ensures that information passes from the producer or supplier of a hazardous material to Control Tech and from Control Tech to our employees. This transfer involves three mechanisms: the WHMIS label, the Safety Data Sheets, and the employee training program.

The material in this document does not take precedence over applicable government legislation which all employees and subcontractors must follow.

45.2 SCOPE

This program applies to all workers of Control Tech and any contractors working for Control Tech.

When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Control Tech workers and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

45.3 RESPONSIBILITIES

Managers

It is the responsibility of each manager to ensure WHMIS requirements are met in all locations under his or her authority, which includes:

- Labelling of all containers
- Ensuring employees are trained
- Ensure that procedures, equipment and materials appropriate for the specific jobs completed are provided to protect the employees
- Providing personal protective equipment (PPE) and monitoring use
- Ensuring SDS (Safety Data Sheets) for all hazardous products are current and available to employees
- Maintaining an updated Hazardous Product Inventory
- Providing the designated supervisor with a copy of the current Hazardous Product Inventory List
- Ensure that the components of this SOP and the applicable legislation are implemented in all facilities under his/her authority

Supervisors

- Advising employees of the hazards associated with the work environment and the materials contained within that environment
- Review key information with the workers prior to working with a product for the first time
- Providing written procedures to employees, where required by the regulation or where the supervisor believes it to be reasonable for the protection of the employees
- Identifying equipment, protective devices and measures to be taken to enable the employees to work safely with hazardous materials
- Ensuring that employees work in compliance with all applicable legislation and procedures, using the required equipment and protective measures identified by the
- supervisor or by the Occupational Health and Safety Act or Regulations
- Making sure all hazardous materials in the workplace are labeled appropriately
- Maintaining a current file of SDSs for all hazardous materials used in the workplace. All SDSs must be current to within three years. New or updated SDSs should be obtained from the supplier
- promptly investigate and report any known or suspected chemical exposure incidents, unsafe conditions or unsafe procedures to the Department Head, Departmental Safety Officer and the Department of Environmental Health and Safety
- Providing any information regarding the hazardous material to a doctor or nurse in the case of an exposure or medical emergency
- Updating chemical and biological inventories on an annual basis.

Employees

- Be familiar with the hazards associated with hazardous materials
- Work in accordance with all applicable legislation and standard operating procedures for hazardous materials
- Apply their WHMIS training to work safely
- Use the appropriate equipment, protective devices and measures provided for working with hazardous materials
- Promptly report any known or suspected chemical exposure incidents, unsafe conditions or unsafe procedures to his/her supervisor

45.4 DEFINITIONS

Hazardous Product - refers to any product, material or substance that is included in any of the six WHMIS classes:

- Compressed gas
- Flammable and combustible material
- Oxidizing material
- Poisonous and infectious material
- Corrosive material
- Dangerously reactive materials

SDS - safety data sheets.

WHMIS - workplace hazardous materials information system.

GHS – Global Harmonized System

45.5 TRAINING

All workers who work with or near hazardous products are provided WHMIS GHS training. Control Tech must ensure that a worker who works with or in proximity to a hazardous product is instructed in:

- Procedures for the safe use, storage, handling and disposal of a hazardous product
- The contents required on a supplier label and workplace label, and the purpose and significance of the information contained on the labels
- The location of Control Tech SDSs, the contents required on a safety data sheet and the purpose and significance of the information contained on the SDS.
- Procedures to be followed in case of an emergency involving a hazardous product

45.6 PROCEDURE

The following procedures shall be followed regarding hazardous materials:

1. Up to date SDS will be made available to all staff who use the product or who work in the workplace where the product is used.
2. If a product has a high hazard rating, an assessment will be made to determine whether a less hazardous material can be used.
3. If no alternative is available, a review of the SDS will be done to determine the risks, protective equipment needed, special storage requirements etc.
4. When a hazardous product is delivered, it must be properly labeled and have the appropriate SDS. If the product is not properly labeled a worksite label must be applied or the product must be sent back to the supplier.
5. Information shall be made available to employees working with the product of the hazards and what precautions are to be taken for safe handling of this product.
6. The SDS shall be placed in a location where all employees have easy access to it at all times.

45.7 STORAGE OF HARMFUL SUBSTANCES

All containers, used or handled at a worksite, which by reason of toxicity, flammability or reactivity create risk to the health or safety of employees shall be contained, so far as is reasonably practicable in a suitable container which is clearly labelled to identify the substance, the hazards associated with its use or handling, the workplace uses for which it is intended and protective measures to be taken by employees before, during and after its use.

Control Tech will ensure that residue or waste from the substance or materials used for cleaning or wiping it is placed into suitably labelled containers for safe disposal.

Harmful substances are to be stored in a self-contained enclosure, room or building that is isolated from work-related areas and worksites and is adequately ventilated and protected from conditions, including excessive temperature, shock or vibration that could reduce the stability or increase the potential hazard of the substance.

45.8 SAFETY DATA SHEETS

SDS (Safety Data Sheets) are obtained for all hazardous products. When Control Tech acquires a hazardous product for use at a worksites it must obtain a supplier SDS for that hazardous product if the supplier is required to prepare an SDS.

SDS's for hazardous materials to which Control Tech employees have been exposed must be maintained after the employee leaves the employment of Control Tech. Before any non-routine task is performed, employees

will be advised of special precautions. In the unlikely event that such tasks are required, the operations manager will provide SDS for involved hazardous product.

SDS are readily available to employees. Control Tech must ensure that a copy of an SDS is made readily available at the workplace to workers who may be exposed to the hazardous product and to the joint committee or to the worker health and safety representative, as applicable.

If Control Tech is required to make an SDS readily available, it may be made available on a computer system if Control Tech takes all reasonable steps to keep the system in active working order, makes the SDS readily available on the request of a worker and provides training in accessing computer-stored SDS to one or more workers working at a worksite where the SDS is available on a computer terminal and members of the joint committee or the worker health and safety representative as applicable.

The joint health and safety committee, the employee health and safety representative, and the workplace health and safety designate have the right to request SDS on any hazardous product and it must be provided without any issues as well as any further hazard information of which Control Tech is aware or ought to be aware concerning the use, storage and handling of that product.

45.8.1 INFORMATION CONTAINED ON THE SDS

Identification

- Product identifier (e.g. Product name)
- Other means of identification (e.g. product family, synonyms, etc.)
- Recommended use
- Restrictions on use
- Canadian supplier identifier+
- Name, full address and phone number(s)
- Emergency telephone number and any restrictions on the use of that number, if applicable

Hazard identification

- Hazard classification (class, category) of substance or mixture or a description of the identified hazard for Physical or Health Hazards Not Otherwise Classified
- Label elements:
    - Symbol (image) or the name of the symbol (e.g., flame, skull and crossbones)
    - Signal word
    - Hazard statement(s)
    - Precautionary statement(s)
- Other hazards which do not result in classification (e.g., molten metal hazard)

Composition/Information on ingredients

- When a hazardous product is a material or substance:
- Chemical name
- Common name and synonyms
- Chemical Abstract Service (CAS) registry number and any unique identifiers
- Chemical name of impurities, stabilizing solvents and/or additives*
- For each material or substance in a mixture that is classified in a health hazard class**:
- Chemical name
- Common name and synonyms
- CAS registry number and any unique identifiers
- Concentration
- **NOTE:** Confidential business information rules can apply

First-aid measures

- First-aid measures by route of exposure:
- Inhalation
- Skin contact
- Eye contact
- Ingestion
- Most important symptoms and effects (acute or delayed)
- Immediate medical attention and special treatment, if necessary

Fire-fighting measures

- Suitable extinguishing media
- Unsuitable extinguishing media
- Specific hazards arising from the hazardous product (e.g., hazardous combustion products)
- Special protective equipment and precautions for fire-fighters

Accidental release measures

- Personal precautions, protective equipment and emergency procedures
- Methods and materials for containment and cleaning up

Handling and Storage

- Precautions for safe handling
- Conditions for safe storage (including incompatible materials)

Exposure Controls/Personal Protection

- Control parameters, including occupational exposure guidelines or biological exposure limits and the source of those values
- Appropriate engineering controls
- Individual protection measures (e.g. personal protective equipment)

Physical and Chemical Properties

- Appearance (physical state, colour, etc.)
- Odour
- Odour threshold
- pH
- Melting point/Freezing point
- Initial boiling point/boiling range
- Flash point
- Evaporation rate
- Flammability (solid; gas)
- Lower flammable/explosive limit
- Upper flammable/explosive limit
- Vapour pressure
- Vapour density
- Relative density
- Solubility
- Partition coefficient - n-octanol/water
- Auto-ignition temperature
- Decomposition temperature
- Viscosity

Stability and Reactivity

- Precautions for safe handling
- Conditions for safe storage (including incompatible materials)

Toxicological Information

- Concise but complete description of the various toxic health effects and the data used to identify those effects, including:
- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact)
- Symptoms related to the physical, chemical and toxicological characteristics
- Delayed and immediate effects, and chronic effects from short-term and long-term exposure
- Numerical measures of toxicity

Ecological information***

- Ecotoxicity
- Persistence and degradability
- Bioaccumulative potential
- Mobility in soil
- Other adverse effects

Disposal considerations***

- Information on safe handling for disposal and methods of disposal, including any contaminated packaging

Transport information***

- UN number
- UN proper shipping name
- Transport hazard class(es)
- Packing group
- Environmental hazards

Regulatory information***

- Safety, health and environmental regulations specific to the product

Other information

- Date of the latest revision of the SDS

45.9 LABELS, LABELLING AND WARNINGS

Supplier labels must be affixed to the original containers of hazardous products. If labels are missing or illegible, they should be replaced with workplace labels.

Control Tech must ensure that the container of a hazardous product or a hazardous product received at a worksite is labelled with a supplier label. As long as any amount of a hazardous product remains in a worksite in the container in which it was received from the supplier Control Tech must not remove, deface, modify, or alter the supplier label. If a label applied to a hazardous product or a container of a hazardous product becomes illegible or is accidentally removed from the hazardous product or the container, Control Tech must replace the label with either a supplier label or a worksite label.

Labels, tags or markings on containers shall list as a minimum:

Words, pictures, symbols or combinations thereof may be used.

- The trade name of the product as listed on the Safety Data Sheet.
- Appropriate hazard warnings to help employees protect themselves from the hazards of the substance.
- Labels provided by hazardous product manufacturers, distributors, and importers must also list the name and address of the manufacturer, importer, or vendor responsible for the hazardous product, and from whom more information about the hazardous product can be obtained.

Workplace labels must be affixed to hazardous products that have been transferred from the original container into another container. If a hazardous product in a worksite is in a container other than the container in which it was received from a supplier, Control Tech must ensure that the container has a worksite label applied to it.

Labels provide the following information:

- The product identifier.
- Safe handling information.
- Reference to the fact that a safety data sheet [SDS] is available.

Used for the following purposes:

- Storage containers of hazardous products produced on-site.
- Storage containers intended to receive bulk shipments (unless the supplier provides a label).
- Portable containers into which product has been transferred by a worker where the container will be used by other workers or for longer than a work shift.

All hazardous products are labelled with either a supplier label or a work site label. Control Tech has a procedure to ensure that a hazardous product or its container at a work site has a supplier label or a work site label on it.

Control Tech will ensure that a hazardous product or the container of a hazardous product that is received from a supplier at a place of employment is labelled with a supplier label. Control Tech or any worker, shall not remove, deface, modify or alter the supplier label on the container of a hazardous product as long as any amount of the hazardous product remains at the place of employment in the container in which it was received from the supplier.

Employees who are unsure of the contents of any container, vessel or piping must contact their supervisor for information regarding the substance including:

- The name of the substance
- The hazards related to the substance
- The safety precautions required for working with the substance.

45.9.1 HAZARDOUS WASTE

Hazardous waste is labelled and workers are trained on safe handling of hazardous waste. Control Tech shall ensure that hazardous waste is handled and stored safely by means of a training and information program and by labels or signs that identify the waste and indicate the precautions to be taken in handling it and in case of exposure to it.

45.9.2 SUPPLIER LABELS

Distinctive "hatch mark" border, letters, numbers which contrast distinctly from any other markings on the containers.

Includes seven categories of information:

1. **Product Identifier -** product name or number which will be identical to the product identifier on the SDS.
2. **Supplier Identifier -** this will include the supplier, manufacturer or importer's name and the location of the principal place of business.
3. **Reference to SDS** - will appear on the WHMIS label when an SDS is required.
4. **WHMIS Hazard Symbols -** must meet the regulatory specifications with a distinctive circular border, and must be displayed in a color that will not be confused with TDG (Transportation of Dangerous Goods) safety marks, such as the orange explosive symbol found in TDG regulations. Prohibited colors are contained in the WHMIS Regulations. Often these are black and white only.
5. **Risk Phrases -** clearly indicates the risks involved when using the product.
6. **Precautionary Measures -** safe handling, use and storage information for the product.
7. **First Aid Measures -** clear description of the immediate steps to be taken in the event of harmful contact with the product (In SDS this is part of Precautionary Measures.

45.9.3 WORKSITE LABEL

Provides the following information:

- The product identifier.
- Safe handling information.
- Reference to the fact that a safety data sheet [SDS] is available.
- Used for the following purposes -
- Storage containers of hazardous products produced on-site.
- Storage containers intended to receive bulk shipments (unless the supplier provides a label).
- Portable containers into which product has been transferred by a worker where the container will be used by other workers or for longer than a work shift.

Acetone
Extremely Flammable
Keep away from all sources of ignition
Wear butyl rubber gloves and chemical splash goggles
See SDS

If Control Tech produces a hazardous product in our worksites it shall ensure that the hazardous product or the container of the hazardous product has our worksite label.

Employees who are unsure of the contents of any container, vessel or piping must contact their supervisor for information regarding the substance including:

- The name of the substance
- The hazards related to the substance
- The safety precautions required for working with the substance.

Labels, tags or markings on containers shall list as a minimum:

- Words, pictures, symbols or combinations thereof may be used.
- The trade name of the product as listed on the Safety Data Sheet.
- Appropriate hazard warnings to help employees protect themselves from the hazards of the substance.
- Labels provided by hazardous product manufacturers, distributors, and importers must also list the name and address of the manufacturer, importer, or vendor responsible for the hazardous product, and from whom more information about the hazardous product can be obtained.

45.10 WHMIS 2015/GHS HAZARDS CLASSIFICATIONS AND SYMBOLS

PHYSICAL HAZARDS	
EXPLOSIVE	
	• Unstable explosives • Explosives, divisions 1.1, 1.2, 1.3, 1.4 • Self-reactive substances and mixtures, types A, B • Organic peroxides, types A, B
FLAMMABLE	
	• Flammable gases, category 1 • Flammable aerosols, categories 1, 2 • Flammable liquids, categories 1, 2, 3 • Flammable solids, categories 1, 2 • Self-reactive substances and mixtures, types B, C, D, E, F • Pyrophoric liquids, category 1 • Pyrophoric solids, category 1 • Self-heating substances and mixtures, categories 1, 2 • Substances and mixtures, which in contact with water, emit flammable gases, categories 1, 2, 3 • Organic peroxides, types B, C, D, E, F
OXIDIZING	
	• Oxidizing gases, category 1 • Oxidizing liquids, categories 1, 2, 3 • Oxidizing solids, categories 1, 2, 3
COMPRESSED GAS	
	• Compressed gases • Liquefied gases • Refrigerated liquefied gases • Dissolved gases

CORROSIVE	
	• Corrosive to metals, category 1
no pictogram required	• Explosives, divisions 1.5, 1.6 • Flammable gases, category 2 • Self-reactive substances and mixtures, type G • Organic peroxides, type G

HEALTH HAZARDS

TOXIC	
	• Acute toxicity (oral, dermal, inhalation), categories 1, 2, 3
CORROSIVE	
	• Skin corrosion, categories 1A, 1B, 1C • Serious eye damage, category 1
IRRITANT	
	• Acute toxicity (oral, dermal, inhalation), category 4 • Skin irritation, categories 2, 3 • Eye irritation, category 2A • Skin sensitization, category 1 • Specific target organ toxicity following single exposure, category 3 • Respiratory tract irritation • Narcotic effects ***Not used[3]*** • with the "skull and crossbones" pictogram • for skin or eye irritation if: • the "corrosion" pictogram also appears • the "health hazard" pictogram is used to indicate respiratory sensitization
HEALTH HAZARD	
	• Respiratory sensitization, category 1 • Germ cell mutagenicity, categories 1A, 1B, 2 • Carcinogenicity, categories 1A, 1B, 2 • Reproductive toxicity, categories 1A, 1B, 2 • Specific target organ toxicity following single exposure, categories 1, 2 • Specific target organ toxicity following repeated exposure, categories 1, 2 • Aspiration hazard, categories 1, 2

no pictogram required	• Acute toxicity (oral, dermal, inhalation), category 5 • Eye irritation, category 2B • Reproductive toxicity – effects on or via lactation
ENVIRONMENTAL HAZARDS	
ENVIRONMENTALLY DAMAGING	
	• Acute hazards to the aquatic environment, category 1 • Chronic hazards to the aquatic environment, categories 1, 2
no pictogram required	• Acute hazards to the aquatic environment, categories 2, 3 • Chronic hazards to the aquatic environment, categories 3, 4

46.0 WORKING ALONE

All workers of Control Tech will follow the Work Alone Procedure set out in this safety program. No worker will work alone without ready communication set up and regular communication schedules between him/her and some other designated person in the company or designated service provider.

Each work site shall develop a Working Alone Plan and must provide effective radio, telephone, cellular phone or other electronic communication between a worker who works alone and persons capable of assisting the worker in an emergency or if the worker is injured or ill.

Each work site's Working Alone Plan shall address having an established contact person. A person must be designated to establish contact with the worker at pre-determined intervals and the results must be recorded by the contact person.

If electronic communication is not practicable or readily available at the work site, Control Tech must ensure that a representative of Control Tech or another competent worker visits the worker, or the worker contacts Control Tech or another competent worker.

These visits or contacts shall be at intervals of time appropriate to the nature of the hazards associated with the worker's work. As a minimum, contact shall occur no less than every four hours.

The Hazard Assessment and Working Alone Plan at each Control Tech work site must be reviewed on an annual basis or when work processes or arrangements which could affect a worker's well-being are introduced or changed.

The material in this document does not take precedence over applicable government legislation which all employees must follow.

46.1 PURPOSE

This policy and procedure is intended to establish site specific procedures for checking the well-being of a worker assigned to work alone.

46.2 SCOPE

This program applies to all workers of Control Tech, temporary workers and any contractors working for Control Tech.

When work is performed on a non-owned or operated site, the operator’s program shall take precedence, however, this document covers Control Tech workers and contractors and shall be used on owned premises, or when an operator’s program doesn’t exist or is less stringent.

46.3 OBJECTIVES

To minimize risk to employees who may work alone and assistance is not readily available Control Tech will:

1. Conduct written hazard assessments to identify existing or potential working alone hazards.
2. Take measures to eliminate or control the hazards of working alone at Control Tech worksites.
3. Ensure that affected employees are informed of the hazards and methods used to control or eliminate them.
4. Provide an effective system for communication between any employee who work alone and persons capable of assisting the employee.
5. Ensure all incidents (working related or otherwise) are reported, investigated and documented.

6. Review the Working Alone Plan at least annually or more frequently if there is a change in work arrangements which could adversely affect an employee's well-being or a report that the system is not working effectively.

46.4 RESPONSIBILITIES

Safety Manager

- Conducts a hazard assessment to identify existing or potential hazards related to the nature of the work or the work environment given the circumstances of the work when working alone
- Responsible for the review, implementation and maintenance of the local worksite Working Alone Plan.
- Communicate this policy and its procedures to employees who work alone
- Annually review the effectiveness of the hazard controls and procedures and make improvements as required

Worksite Project Manager

- Responsible for the implementation and maintenance of the Working Alone Plan for their facility and ensuring all assets are made available for compliance with the procedure.
- Take all reasonable and practical steps to minimize or eliminate identified working alone risks.

Employees

- Report all incidents of work site incidents immediately to their supervisor as required by local regulatory requirements.
- Participate in work site hazard assessments and the implementing of procedures to eliminate or control hazards of working alone.
- Take every reasonable precaution when working alone.
- Shall follow the requirements of the Working Alone Plan

46.5 TRAINING

Workers are provided training on working alone procedures. A worker required to work alone and any person assigned to check on the worker must be trained in the written procedure for checking the worker's well-being.

Training will include:

- Any revision to the written local Working Alone Plan and safe work practices.
- Being informed of working alone hazards at the Control Tech worksite and the methods used to control or eliminate them.
- The methods for identification, hazard reduction and prevention when working alone and dealing with situations or individuals that presents a potential risk.
- A worker required to work alone and any person assigned to check on the worker must be trained in the written procedure for checking the worker's well-being.
- All training shall be documented.

46.6 SAFE WORK PROCEDURES

46.6.1 HAZARD ASSESSMENT

A hazard assessment must be conducted to evaluate the risk of working alone and identify appropriate control measures. Before a worker is assigned to work alone or in isolation Control Tech must identify any

hazards to that worker. Before a worker starts a work assignment Control Tech must take measures to eliminate the hazard, and if it is not practicable to eliminate the hazard to minimize the risk from the hazard.

46.6.2 THE HAZARD ASSESSMENT SHALL INVOLVE:

A review of records, past incidents and identify measures or actions needed to correct any hazards.

Participation by the committee at the workplace, the representative at the workplace, or when there is no committee or representative, the workers at the workplace.

Participation by employees through methods such as one-on-one interviews, focus groups, employee surveys and work site inspections.

The assessment will also collect and document information from employees about their experiences working alone, their current concerns, and their suggestions for improvement.

Consideration for the time interval between checks and the procedure to follow in case the employee cannot be contacted, including provisions for emergency rescue.

46.7 PLAN

Control Tech must develop and implement a site specific written procedure for checking the well-being of a worker assigned to work alone or in isolation under conditions which present a risk of disabling injury, if the worker might not be able to secure assistance in the event of injury or other misfortune.

Control Tech will post a copy of the safe work procedures in a conspicuous place at the workplace.

How often a worker working alone must be contacted:

The procedure for checking a worker's well-being must include the time interval between checks. In addition to checks at regular intervals, a check at the end of the work shift must be done. Check in times will not exceed 4 hours at any time.

46.7.1 COMMUNICATION AND REGULAR CONTACT PERSON SYSTEM

Each worksite's Working Alone Plan shall require workers to carry a cellular phone or electronic monitoring device at all times while working alone. A means of communication must be established for the person working alone and should include regular contact at designated time intervals. This should be accomplished by the use of a cellular phone or other electronic monitoring device when possible.

Procedures to be followed if Electronic Communication is Not Practicable

If electronic communication is not possible, another means of communication must be established. This may include visits to the worker by a designated employee or having the worker contact that designated employee by other means (physically reporting to the designated employee, etc.).

Example requirements include:

Control Tech must ensure that a representative of Control Tech or another competent employee visits the employee or the employee contacts Control Tech or another competent employee. These visits or contacts shall be at intervals of time appropriate to the nature of the hazards associated with the employee's work. As a minimum, contact shall occur no less than every four hours. In addition to checks at regular intervals, a check at the end of the work shift must also be done.

46.7.2 WHO IS RESPONSIBLE FOR CHECKING ON WORKERS WORKING ALONE

A person must be designated to establish contact with the worker at predetermined intervals and the results must be recorded by the person.

46.7.3 LIMITATIONS ON OR PROHIBITIONS OF SPECIFIED ACTIVITIES:

- No heavy equipment will be operated if a worker is alone.
- No hot work will occur if a worker is alone.
- No working at heights will occur if a work is alone and requiring a personal fall arrest system.
- No working alone outside if temperatures are low enough to pose an imminent risk to the worker.
- Other limitations will be placed based on the site specific hazard assessment

46.7.4 PROVISIONS OF PPE

- Cold weather clothing shall be worn when appropriate if a worker is alone.
- Additional PPE for workers working alone will be identified in the site specific hazard and PPE assessment process.

46.8 SAFE WORK PRACTICES

Controls implemented at Control Tech worksites shall, as a minimum:

1. Restricted building access to buildings - card keys or regular keys after regular working hours.
2. Office doors are to be locked when working alone after hours.
3. Have employees check road reports and weather forecast before traveling and NOT allow travel if road conditions are dangerous.
4. Develop a travel plan that includes rest breaks, a procedure for tracking overdue employees and emergency contact information.
5. Ensure all Control Tech vehicles are to be equipped with cell phones or radios and first aid kits.
6. Advise employees to travel with another employee when possible.
7. Advise employees to park close to the building in the evening.
8. Post signage, emergency contact information, and develop a communication system.
9. Report suspicious activity to security or a supervisor.

Procedures to be followed in the Event that a Worker Working Alone Does Not Respond

The procedure for checking a worker's well-being must include the procedure to follow in case the worker cannot be contacted, including provisions for emergency rescue. Minimum requirements include:

1. Attempt every available method of contacting the worker who is not responding.
2. Dispatch at least two workers together (for safety purposes) with effective communication equipment to the last known location of the worker who is not responding.
3. If the worker remains missing, contact local authorities after the Human Resources department has contacted the missing worker's designated personal point of contact from employment records.
4. If the missing worker is located, immediately notify local authorities.

46.9 PROVISION OF EMERGENCY SUPPLIES

- All vehicles shall contain the appropriate emergency supplies including flares, marking devices, food, water, warm clothing during winter and other supplies as determined by the hazard assessment.
- Workers working alone shall have spare batteries for communication devices in case of power failure, a radio for local weather conditions and other equipment as determined by the hazard assessment.

46.10 REVIEW AND UPDATING WORKING ALONE PLAN

- The hazard assessment and Working Alone Plan at each Control Tech worksite must be reviewed at least on an annual basis or more frequently if there is a change in work processes or arrangements which could adversely affect an employee's well-being are introduced or changed.
- The local Working Alone Plan shall also be revised if there is any indication or report that the plan is not working effectively or needs changing.
-